# Eating on the Edge

**A study focusing on dietary habits and nutritional status among illicit drug addicts in Oslo, Norway**

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Xie Zhu-Fan:

*Only with ample substance can human body function in a healthy way; and only when the functional processes are in good condition, can the essential substances be appropriately replenished* (1).

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# PREFACE AND ACKNOWLEDGEMENTS

My first introduction to the field of drug addiction occurred at Ila Prison several years ago while collecting data for my master thesis: Food, nutrition and health among long time prisoners (2). At the prison, I came into contact with inmates who continued to be under the influence of illicit drugs serving sentences for drug-related crimes. In 1999, I was again in contact with heavy drug users while investigating the foods supplied by the Salvation Army in Oslo to its users (3).

Those who recommended me for this thesis probably assumed that I was accustomed to working with drug users. After agreeing to run this project, I allocated a grant in autumn of 2001 to enable me to start planning data collection. This had two main purposes:

**1** To generate new knowledge about Norwegian illicit drug addicts nutritional status and related health problems: Food accessibility and preparations (catering), intake of food items, energy and nutrients, education, source of income, housing, and anthropometric and biochemical measurements (nutrient metabolites and infections markers). A report in Norwegian language, based on results from the 167 first respondents: *Mat i kampen for et verdig liv ved rusmiddelavhengighet (Food for a dignified life by drug addiction)* (4) was first time presented the 2nd of December 2002 at a press conference at Hotel Opera, Oslo. This was primarily addressed authorities and politicians through constructive suggestions, to improve quality of life for illicit drug users.

My students and I developed a cookbook in collaboration with the Salvation Army called "*Suppe på en spiker*" (literally "Soup from a nail", a Norwegian expression meaning to make the most of what you have available) (5, 6) The recipes were adapted to drug addicts' sensory preferences, nutritional needs and financial situation.

**2** To present selected results in international scientific journals as part of a doctoral thesis.

I would like to thank my main supervisor, Senior Scientist and Professor Margaretha Haugen of the Norwegian Institute of Public Health, for her support and help in overcoming the various challenges involved in this project, not least performing the statistical calculations, participating in the writing of four papers and reading "Kappa". I am particularly grateful for her rare ability to ask insightful questions that saved me unnecessary work. Her unusually positive attitude and caring approach made it a pleasure to work with her.

I am highly indebted to physician Frank-Leo Erikson. Without his tireless support and participation, we would never have succeeded in collecting data from such a hard accessible group of respondents. He suggested the inclusion of nutrition-related blood analyses, and assisted in data collection from January 2002 until May 2003. He also conducted considerable follow-up of the addicts' health problems as part of a different sub-project.

I would also like to thank my contact supervisor, Professor Margareta Wandel of the University of Oslo, for her valuable support in the writing process throughout the project. Her contributions have been invaluable to me since I accepted onto the Ph-D program of the Medical Faculty of University of Oslo in January 2006.

I am also very grateful for deceased First Amanuensis Anne Smehaugen, because of her devotion to field work, her crucial contributions in the formulation of the questionnaire, and the drafting of the first two papers. Further for her central role in the preparation and giving of two oral presentations of findings from this project at the 8th World Congress of the International Federation for Home Economics IFHE, in Kyoto in 2004.

My thanks also go to Professor Thomas Böhmer of Oslo University Hospital, Aker for his contributions in the specialist fields of blood parameters and related analysis methods, during both the preparation period and the writing process.

I am thankful to Professor Arne Oshaug of Oslo and Akershus University College (HiOA) who gave me the opportunity to work in this challenging field.

I wish to acknowledge the contributions of Assistant Professor Ingrid Barikmo and Master Students Marit Nergaard Aas and Therese Kleppestø in the preparation, collection and entering of project data.

I owe a particular debt of gratitude to the staff of the Library at HiOA, Kjeller for their kind help in finding literature and references.

This research would not have been possible without the financial assistance of TINE BA, Leo Pharmaceuticals and Akershus University College (HiAk), and I would like to express my gratitude to those bodies. HiAk (now HiOA) provided me with 30 percent R&D funding in the period 2006 to 2013, which enabled me to work on this thesis.

I also thank all of the study respondents, the Drug Administration in Oslo, the Salvation Army in Oslo, the Church Mission of Oslo and all other contributors, small and not so small, for their support and involvement in the field investigation. The Norwegian Broadcasting Corporation also contributed help to focus attention on the living conditions of illicit drug addicts, making this project its top story on the Saturday news on 14th October 2002. The project has also been covered by NRK-radio several times.

Thank to my friend Rose Vikse, Senior Scientist of the Norwegian Institute of Public Health, and her son Anders, for reviewing the entire thesis. Her sharp eyes and support were invaluable during the last stage of the writing process.

My dear son Marius, thank you for never losing faith in my abilities.

Last, but not least, I owe a special debt of gratitude to Five Element Acupuncture practitioner Henrik Mathisen. Following decades of progrediating asthma and heavy medications, his intervention freed me from the disease and the drugs. That gave me improved health and enabled me to continue my work and conclude this project.

Oslo, August 2013

Mone Eli Sæland

# SUMMERY

The use of illicit drugs is initially about entering an elevated state of joy, relief and power that not is accessible in other ways. Unfortunately, drug abuse also has various unintended and undesirable consequences, including withdrawal symptoms, hyperactivity, impulsivity, compulsion and loss of control with consequential relapse. Furthermore, it often leads to degrading activities such as prostitution and criminal conduct, increased susceptibility to acute and chronic infections, drug overdoses and unhealthy relationships with food, family and friends.

This cross-sectional study targeted illicit drug addicts living on the fringes of our affluent society, and aimed to explore dietary habits and nutritional status through the assessment of dietary, anthropometric and biochemical measurements. A semi-structured interview covered drug habits, socio-demographic factors and living conditions assumed to influence food accessibility and infectious status. Recruitment, inclusion and examination took place at the same time at 23 different locations in Oslo. Data were collected all week days both during night and day.

The 195 respondents were regular poly drug addicts, and 87 percent of them injected the drugs. All were under the influence of illicit drugs at the time of examination, and women made up 37 percent of the total sample. All respondents were at least 18 years of age, with a mean age of about 35 years. The educational level was generally low, and social security benefits and disability pension were the most frequent sources of income. Further, most of the addicts were homeless, and all reported smoking tobacco.

Limited access to food was reported by 64 percent of the addicts, and related to heavier involvement in drug abuse, drug dealing, unstable housing, low intakes of energy and being underweight. Contentment with access to food related to receiving a disability pension, smoking hashish, recent involvement in treatment or rehabilitation, receiving additional food from providers, family and friends, cooking activity and number of eating events.

Approximately 40 percent of the drug addicts never prepared a hot meal, even though 85 percent reported access to cooking facilities and 80 percent to a refrigerator.

Whereas male addicts had 2.6 (SD 1.4) daily eating events on average, the figure for females was 2.7 (SD 1.6). Men reported having dinner more frequently, while women reported a higher number of snack meals. Most meals eaten during the previous 24 hours consisted of sandwiches and snacks, which accounted for more than half of energy intake. Daily food intake varied from nothing to huge amounts – only 38 percent of the male addicts and 20 percent of the females had a homeostatic intake. The diet was quantitatively and qualitatively inadequate, and nutrient density was below that of the average Norwegian diet. Food choice was monotonous and easily chewable food items with high contents of added sugar (30 E %) were a major dietary component. Sugar-sweetened soft drinks were consumed most often. The intakes of whole grain flour, edible fats, fruit, vegetables and fish were very low.

The number of eating events associated positively with BMI, as did the number of days institutionalised (≤14) in the previous 12 months, while sleeping rough had a negative association. Few respondents achieved the recommended intakes (RI) of most of the essential macro- and micro-nutrients, and between 70 percent and 100 percent of the respondents had lower intakes of the vitamins A, $B_1$, C, D, and E, and lower intakes of selenium and iron than recommended.

Anthropometric and biochemical measurements supported the finding of poor dietary intakes. Underweight (BMI≤18.5) was found in 27 percent of the women and 3 percent of the men. The high frequency of outlier values in the biochemical parameters, indicated that malnutrition and metabolic disturbances were prevalent and varied from 0–100 percent. Between 67 percent and 100 percent of the respondents did not meet the vitamin $D_3$ and $B_6$ reference values. Between 12 percent and 26 percent of the respondents had haemoglobin levels that fell below the reference values, while low serum-ferritin (SF) values were found in 5 percent of the men and 19 percent of the women. This indicated that iron intakes were probably sub-optimal, particularly among the women.

It is likely that the female addicts were most exposed to poor dietary intakes, heavy drug abuse and infections. In total, 90 percent of the addicts suffered from virus hepatitis infections. No association was detected between these infections and nutritional status, presumably due to the high frequency of infections. However, abscess infections, which were reported by 33 percent of the women and 19 percent

of the men, were related to poorer nutritional status. Eighty per cent of respondents, who used heroin on a regular basis, reported more infections and had a further reduced nutritional status than the drug addicts who did not use heroin regularly. All but two (98 percent) injected the heroin, while 42 percent injected of those using other drugs but heroin on a regular basis.

Today, it is accepted that drug addiction is a disease due to the physical changes that occur in areas of the brain critical to judgment, decision-making, behaviour control and learning and memory. This must be kept in mind when considering problems linked to the assessment of illicit drug users' dietary habits and nutritional status, and measures to improve these conditions. If the target for the nutritional status of drug users is to reach the average Norwegian level, dietary interventions have to be tailored to fit addicts' particular needs, with a focus on food accessibility and the sensory and nutritional quality of the diets.

## LIST OF PAPERS

*Paper I*
Saeland Mone, Haugen Margaretha, Eriksen Frank-Leo, Smehaugen Anne, Wandel Margareta, Böhmer Thomas and Oshaug Arne (2009) Living as a drug addict in Oslo, Norway – a study focusing on nutrition and health. Public Health Nutr 12, 630-636.

*Paper II*
Saeland Mone, Haugen Margaretha, Eriksen Frank-Leo, Wandel Margareta, Smehaugen Anne, Böhmer Thomas and Oshaug Arne (2011) High sugar consumption and poor nutrient intake among drug addicts in Oslo, Norway. Br J Nutr 105, 618-624.

*Paper III*
Saeland Mone, Wandel Margareta, Böhmer Thomas and Haugen Margaretha.
Abscess infections and malnutrition – a cross-sectional study of poly drug addicts in Oslo, Norway. Under review.

*Paper IV*
Saeland Mone, Wandel Margareta, Thomas Böhmer, and Haugen Margaretha Heroin use and nutritional status in poly drug addicts in Oslo, Norway.
In preparation.

# LIST OF ABBREVIATIONS

ASAM: The American Society of Addiction Medicine

BMI: Body Mass Index: body weight/body height$^2$ (kg/m $^2$)

EMCDDA: European Monitoring Centre for Drugs and Drug Addiction

GCDP: Global Commission on Drug Policy

IDU: Injection/Injecting drug use. The term Injection Drug Users (IDUs) originates from this definition and means drug abusers administrating drugs by injection.

MUAC: Mid Upper Arm Circumference

NIDA: National Institute of Drug Abuse - USA

OST: Opioid Substitution Treatment, for instance Methadone or Subutex.

PALei: Physical Activity Level (energy intake/resting metabolic rate)

PDU: Problem Drug Use

PUFA: Poly Unsaturated Fatty Acid(s)

# 1 INTRODUCTION

Illicit drug addicts often lead a miserable existence on the margins of our affluent society, constantly trying to avoid abstinence, creditors and the police. Such activities are incompatible with normal daily life, including the planning and cooking of proper meals.


**Picture 1** Eating on the edge in downtown Oslo, 2002.
(Reproduced with the permission of the subject and the photographer.)

## *1.1 Drug, diet and nutrition*

### 1.1.1 Drug abuse

Drug abuse includes both the use of illegal drugs and the taking of medicinal drugs for other reasons, usually in higher dosages and/or in other ways than prescribed (7).

According to the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), problem drug use (PDU) is defined as injecting drug use or long-duration/regular use of opioids, cocaine and/or amphetamines (8).

Drugs may affect an organism in different ways at the somatic, emotional, mental and spiritual levels, influencing mood, stress, cognition and potentiating depressive symptoms (9). Occasional abuse usually starts early, and peaks in the teen years, and regular abuse may develop into drug addiction (7, 10, 11).

Mental disorders, mainly anxiety and depression, among drug addicts have been reported with a prevalence ranging from 50–90 percent. Such disorders may have developed prior to drug abuse, and may function as risk factors in the development of drug addiction (12).

### 1.1.2 Drug addiction

Drug addiction is defined as a disease due to the physical changes that occur in areas of the brain critical to judgment, decision-making, behavior control, learning and memory. These changes foster compulsive drug abuse and a preference of using and obtaining drugs rather than meeting essential needs (7, 10, 11, 13).

Anecdotal information indicates that drug abusers prefer to call themselves “drug addicts”, as they find the terms “abuser” and “misuser” derogatory.

### 1.1.3 Dietary habits and drug abuse

Associations between poor dietary habits and abuse of drugs may be established prior to development of drug addiction. In a study of high school students, those who used either single or multiple drugs were found to have a higher risk of unhealthy dietary practices than students who were not using drugs (14). Drug abuse has been associated with food insecurity (15). Food security includes access to food and dietary intake. Sharing a meal is a basic component in socialization, and sufficiently supplies of energy and essential nutrients are necessary for man to grow, develop and maintain life (16).

### 1.1.4 Food accessibility

Food accessibility and dietary habits are critical determinants of nutritional status, and epidemiological studies have shown strong associations between diet and health (17). Studies from abroad, mainly carried out just prior to or during detoxification or other drug related treatment programs, have associated illicit drug use with impaired food

accessibility, decreased appetite (18), poor food choice and few meals (19-21). Illicit drug users in general have low interest in eating and suffer from malnutrition (22).

### 1.1.5 Dietary intake

Earlier studies from other countries than Norway have reported that drug users had low intakes of healthy food items such as fruit, vegetables, bread and cereals. Further they had an enhanced preference for custard and ice cream, fruit jelly, fruit cocktail and cookies, and high intakes of coffee and alcohol (19-21, 23). The drug addicts' reported to eat diets that were rich in carbohydrates, especially sucrose, but poor in fat and protein and deficient in vitamins A, $B_1$, $B_2$, $B_{12}$, ascorbic acid, iron, sink, selenium, copper and fiber. Reported intakes of poly unsaturated fatty acids (PUFA) and animal proteins were low (20, 23, 24).

### 1.1.6 Malnutrition

Few meals and a poor food choice among drug addicts have been associated with weight loss; low body mass index (BMI), protein energy malnutrition and micronutrient deficiencies (19, 25), all factors known to causes of immunodeficiency (22, 26). Illicit drugs are per se immunosuppressive (27), influencing susceptibility to infectious agents, such as virus including hepatitis B, C and the HIV viruses (19). Behavioral risk factors such as needle-sharing, unprotected sex, sex with multiple partners, etc. (28) make a heavy burden to a body which also may have the immune nutritional deficiencies described above, ranking the drug addicts at high risk for prevalent infections (19).

### 1.1.7 Earlier Norwegian studies

Two small studies of food services available to drug users, have been carried out in Oslo, and both reported a potential for improvements (3, 29). Investigations of illicit drug users on a larger scale, focusing on dietary habits and nutritional status through anthropometric measurements, biochemical parameters and dietary assessments, have so far not been carried out in Norway.

## *1.2 Prevalence and cost to society*

### 1.2.1 Prevalence

The estimated number of injection drug users (IDUs) in Norway peaked in 2001, with between 12 000 and 16 000 addicts (30). In 2004 the number had dropped to between 9 000 and 12 000. Since then the number of IDUs (who had injected at least once during the last year) is estimated to about 10 000. The decline is mainly due to increased use of opioid substitution treatment (OST). According to information from Brettville-Jensen 2011 (as cited in 31), approximately 25 percent of active IDUs also participate in OST.

### 1.2.2 Cost to society

The Norwegian state and municipalities had an estimated expenditure related to substance abuse in 2010 of EUR 625 million, (equivalent to approximately NOK 5000 millions) excluding social security benefits (32). Treatment of alcohol and drug abuse in 2011 NOK added up to 3,900 millions. The total socio-economic costs of drug addiction including medical, economic, social and criminal justice procedures are very difficult to estimate (33).

## *1.3 Government plans of action*

In general little attention has been paid to food, diet and nutrition in government plans of action addressing drug abuse. These topics may have been overshadowed by the differences of opinion on how to approach drug abuse from the political, economic and legal perspectives, i.e. with greater restriction on one hand and legalization on the other. It has been claimed in Norway that an underlying puritanism may influence general attitudes to how drug abuse should be treated and the kinds of measures drug abusers "deserve" (34).

### 1.3.1 Norwegian plans of action

In the white paper on an overall policy for substance abuse, titled See Me! (33) a holistic approach is taken to the field of drug addiction, and diet is mentioned in relation to dental health and in low- thresholds care. However, food security, cooking skills, dietary habits and nutritional status, which are an essential part of any treatment program addressing marginalized groups, is not among the proposed measures.

Under section 7 of the new Norwegian Health Act (35) the municipality is required to initiate necessary measures to address public health problems, including measures related to housing, education, occupation and income, physical and social environments, physical activity, *nutrition*, injuries and accidents, tobacco use and alcohol and other substance abuse. But how to accomplish the goals for instance the dietary interventions in drug addicts, is not discussed.

### 1.3.2 International plans of action

In June 2011, the Global Commission on Drug Policy (GCDP) published what was described as a groundbreaking report claiming that the war on drugs had failed and recommending a major reform of the global prohibition regime (36). One of the principles on which the report was based was "respect to the human rights of people who use drugs". Among the recommendations were to avoid human physical or psychological abuse during treatment, and to respect the right to self-determination. However, the right to food as a human right (37) was not mentioned in the GCDP report.

In 2011 and 2012 annual reports of the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) (38, 39), the words "food", "dietary habits" or "nutrition" did not appear in the text.

## *1.4 Addiction*

Addiction is related to repeated feelings of reward. Reward is the brain's response to particular behaviors, and originally reward contributed to survival of the individual and the species. Naturally rewarding behaviors are drinking, eating, sexual behavior, maternal and paternal behaviors, and social interactions (10),(Figure 1).

**Figure 1** Illustration of naturally behaviors inducing feeling of reward.


(Reproduced with the permission of the artist.)

The reward circuitry of the brain is functionally very complex, and addictive drugs enhance the functioning of these circuitry tremendously, producing the "high" that drug users seek (10), making strong feelings of joy, relief and power according to anecdotal information (Figure 2).

**Figure 2** Artistic representation of drug induced joy, relief and power.


(Reproduced with the permission of the artist.)

### 1.4.1 Immediate motivation for taking drugs

People take drugs in order to relieve pain, alleviate depression, calm down, feel invulnerable, blunt sensitivity, achieve a state of trance or euphoria and maximize pleasure (23, 40-42).

Some historical and literary examples of motivation for the use of drugs are presented below:

> From Odysseen, Homer, 700 BC
>
> Telemachus is depressed after failing to find his father Odysseus. “Helen, meanwhile, the child of Zeus, had had an idea. Into the bowl in which their wine was mixed, she slipped a drug that had the power of robbing grief and anger of their sting and banishing all painful memories. No one that swallowed this, dissolved in wine, could shed a single tear that day, even for the death of his mother or father, or if they put his brother or his own son to the sword and he were there to see it done" (p. 53) (40).
>
> From the Oseberg ship, 1150 AD
>
> Four Cannabis seeds, which were recovered from the famous Oseberg ship burial of a women, are believed to be connected with the woman’s priestly functions (41, 43).
>
> Sigmund Freud (1856-1939), who experimented with cocaine, stated that the motive force of all human activities is a striving towards the two confluent goals of utility and a yield of pleasure, and we must suppose that this is also true of the manifestations of civilization (42).
>
> From the book The Drug Scene: Help or Hang-up? Why people continue to use sedatives after the medical reason has passed: (p. 38)
>
> > “If one pill helped that much, why not take two?” (44).

### 1.4.2 Sustained drug abuse

Occasional or chronic drug abuse may produce entirely different response with respect to both the magnitude and the direction of the effects (11). The first year with regular

use called “the honeymoon of the drug abuse”, the drug addict experiences a strong and positive effect from the drugs (45). Development of tolerance with chronic use of opiates implies using drugs simply to get back to normal (“get straight”) again (10).

Drug overdoses are one of the risks that drug addicts face, and it is estimated that approximately 3 percent of overdoses prove fatal (46). Reducing over-dose events from injections of heroin had in 1998 focus of attention in Oslo municipals’ measures against complications to drug abuse, without mentioning diet and nutrition (47). A study of mortality with a known cause of death among opiate users in Norway in the period 1997–2003 has shown that 54 percent (113 of 208) of deaths were due to drug overdose, 32 percent due to somatic causes and 14 percent to trauma (48). Another study from Norway showed that the majority of those who died from overdose were men in the mid of their thirties who had injected drugs for several years and most likely had experienced several previous non-fatal overdoses (49). Residential address was the most common place of death, and most cases had been in contact with health and social services close up to the fatal overdose. Gjersing et al conclude that the majority of the cases could have been available for preventive measures through contact with the health and social services (49).

A comparison of illicit drug users in the Nordic capitals published in 1996, showed that Oslo had the greatest number of fatal intoxications per $10^5$ inhabitants, followed by Copenhagen, Stockholm and Helsinki (50). Oslo had also by far the highest number of overdose deaths compared to Amsterdam, Copenhagen and Frankfurt am Main (51). A follow up report from the same project described drug users’ own thoughts on overdoses and what made them more vulnerable (52): Most of them had experienced several overdoses. They could not always explain why this had occurred, but some suggested tiredness, stress situations, long term without sleep, or long time without food, as factors which might have contributed to increased vulnerability ….A 41 year old male drug user added:

> “It has to do with how much nourishment you have in your body, what shape you’re in that day....” (52).

# 2 MAIN OBJEVTIVES

Most drug addicts live outside a treatment setting or institution, and their life style is generally agreed to be unhealthy. Studies of their dietary habits and nutritional status have mainly been carried out at the beginning of and/or during health promoting interventions. In the present study we wished to focus on addicts who were not currently taking part in any drug-related intervention program. We believed that drug addicts' dietary habits and nutritional status would best be assessed outside treatment and institutions. The present study are the first large scale investigation in Norway of illicit drug addicts, focusing on dietary habits and nutritional status through anthropometric measurements, biochemical analyses and dietary assessments.

## 2.1 *Objectives*

I

To investigate nutritional status and living conditions of drug addicts, including drug history, education, source of income, housing and number of eating events, in addition to drug related and sexual transmitted infections (STI).

II

To investigate access to food, food preferences, intakes of energy and nutrients, and nutritional related biochemical analyses in blood.

III

To explore frequency of abscess infections in poly drug addicts relative to mal-nutrition.

IV

To explore how regular use of heroin in poly drug addicts relate to food intake and nutritional status, relative to drug addicts using other drugs.

# 3 METHODS

No official or unofficial lists of illicit drug users in Oslo were available or accessible. The Drug Administration in Oslo (now the Agency for Welfare and Social Services), the Salvation Army and the Church City Mission in Oslo provided information on suitable recruitment locations.

## *3.1 Study design*

The research team sought out subjects in locations known to be frequented by illicit drug addicts, and invited them to participate in the study then and there. Making appointments with addicts living outside a treatment setting or institution was found to be impossible. Since all the measurements were carried out during a single session, the study had a cross-sectional design, providing a snapshot of the respondents' exposure and outcome related to dietary habits and nutritional status. The data collection period lasted from 28 November 2001 to 30 April 2003. There were a number of delays caused by practical and administrative problems.

**The following methods were used:**

**1 Anthropometry**

Height and weight and Mid Upper Arm Circumference (MUAC) were measured.

**2 Biochemical analyses**

Blood samples were analyzed for drug abuse, concentrations of various nutrients, nutrient-related metabolites and infection markers.

**3 Interview**

The respondents were interviewed with the help of a pre-coded questionnaire to obtain data on demographics, drug habits, living conditions, and abscess infections.

**4 Dietary survey**

One single 24-hour dietary recall was used to assess the dietary intakes.

## *3.2 Ethics and approval for research*

The study protocol was approved by the Norwegian regional committee for medical research ethics, and the handling and storage of personal data by the Norwegian Social Science Data Service. The study was conducted in accordance with ethical principles set out in the Helsinki Declaration (53).

All the respondents were given oral and written information and provided a written consent (Appendix 1). They were informed that the data would be anonymized and could not be traced back to its origin. Assurance was given that their answers would not be made available to police or authorities of any kind, and that the examination would take place immediately and last for about 45 minutes.

## *3.3 Recruitment*

Direct recruitment took place both at night and during the day at 23 different locations within a radius of about 25 km in Oslo. The locations included Plata (a central location for peddling drugs), the Salvation Army's café (Fyrlyskorpset kafé in Urtegata), and at the Church's City Mission (Møtestedet in Skippergata). All recruitment locations are shown in Table 3.1. None of the locations were hiding places or private premises. A total of 400 drug addicts were invited to participate and 220 were recruited.

**Table 3.1** The 23 different locations for recruitment and examination.

| Locations | Number of visits | Number of respondents |
|---|---|---|
| Dahlsbergstien | 6 | 26 |
| Marcus Thranes hus | 8 | 28 |
| Ila hybelhus | 7 | 15 |
| Fagerborg | 2 | 1 |
| Pro-Senteret | 6 | 12 |
| Josefines hus | 1 | 2 |
| Thereses hus | 4 | 7 |
| Kongens gate/ Plata/Møtestedet Sprøytebussen/Skippergata | 11 | 39 |
| Urtegata Fyrlyskorpset kafe/Feltpleien | 6 | 9 |
| Natthjemmet | 6 | 15 |
| Bryn | 5 | 12 |
| Bjørnegård | 4 | 9 |
| Haugenstua | 4 | 12 |
| Skøyen | 5 | 14 |
| Sagene | 8 | 6 |
| Stabekk | 2 | 3 |
| Marita Stiftelsen/Trappa | 1 | 3 |
| Lassonløkken | 4 | 9 |
| Sporveisgaten – Frelsesarmeen | 4 | 8 |
| Enga | 2 | 4 |
| SUM | 92 | 220 |

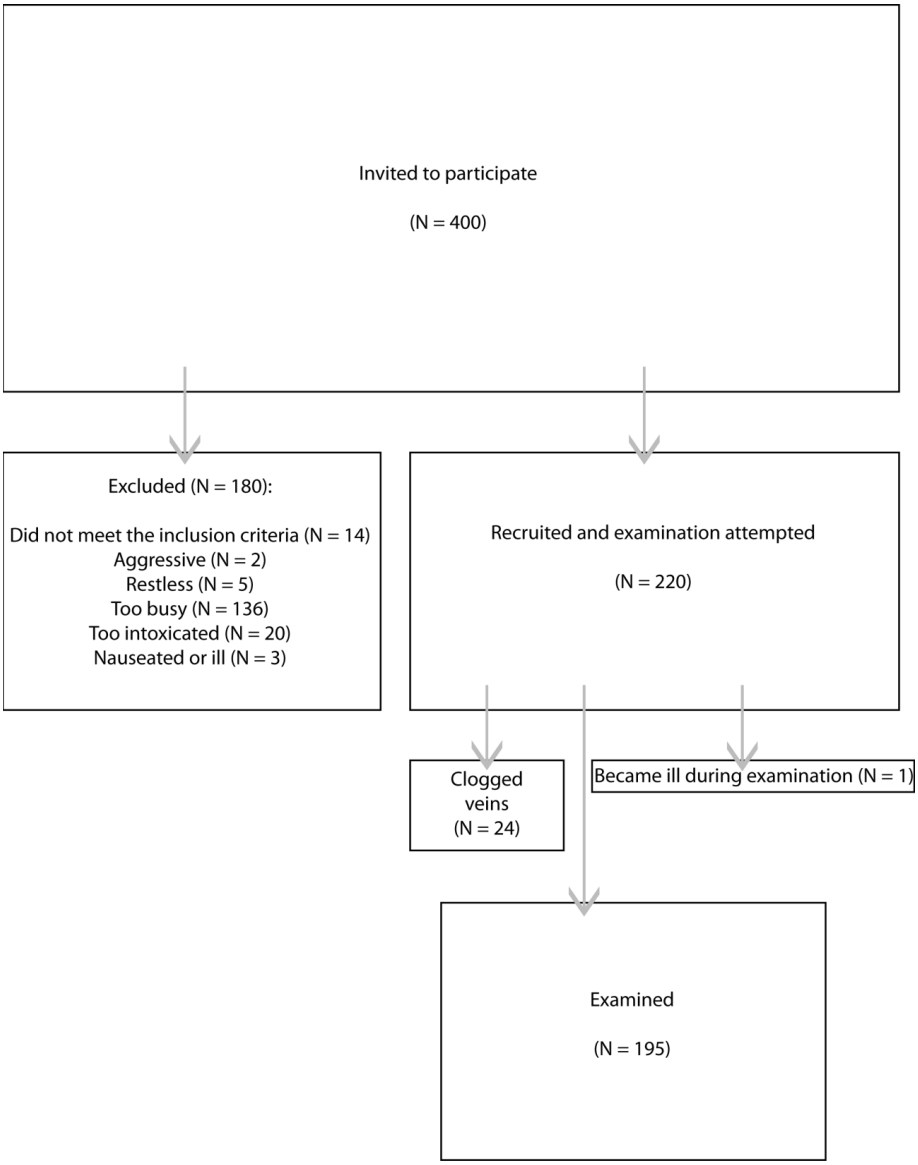
### 3.3.1 Inclusion and exclusion criteria

The inclusion criteria were: current use of illicit drugs, no current participation in any drug-related treatment program, and age over 18 years. They also had to be able to sign the written consent form and to stand upright while the body height and weight were measured. Then examination continued with the participant sitting on a chair with armrests. Those who were aggressive, restless, too busy to participate, too intoxicated, suffering from impaired attention, or in a very bad shape at the time of data collection were excluded (Figure 3). An exception was made for a drug addict in very bad shape living in the Ila hybelhus sheltered housing unit, who participated even though he was bedridden. The drug addicts in Oslo were difficult to trace probably for reasons such as illness or because they were resting or sleeping round in occupied houses or in empty containers on the docks.

During the examination, one person was not able to complete the investigation due to self-inflicted razor cuts on his forehead, which had initially been hidden by his hair. He received help and was acute hospitalized. Twenty-four respondents were withdrawn from the data set due to incomplete data registration. Long-term inadequate injection hygiene disqualified some respondents partly or completely from blood sampling, so the number of biochemical analyses varied (Papers I-IV).

In the first 25 drug addicts who were examined, reported use of drugs was compared with drugs detected in their blood. They were included in the sample, which totalled 195 respondents (Figure 3).

**Figure 3** The recruitment process and final number of respondents.



### 3.3.2 Respondents

Women made up 37 percent of the sample. About 16 percent of all the respondents had their official residency outside Oslo. Most were regular poly drug addicts and all were under the influence of illicit drugs at the time of examination, and 87 percent reported regular injection of drugs. The mean age for the 123 men was 36.2 (SD 7.0) years and for the 72 women 34.5 (SD 7.4) years. All reported smoking tobacco.

Some of the respondents appeared to be under heavy influence of drugs during the examination/interview. This was evidenced by fluctuating attention and focus and apparent lapses into unconsciousness. But usually they responded after some delay. Others, who were in a state of hyperactivity, had to be calmed down prior to the examination. However, most of the respondents behaved with dignity, and some apologized for the state they were in. Those who completed the whole examination including the interviews were rewarded with cigarettes and food.

## *3.4 Staff and tasks*

The investigators consisted of three master students in nutrition, three biomedical laboratory technicians, one physician and one doctoral student, who was the project leader (Table 3.2). All the interviewers had education and training in nutrition and in how to collect dietary data. They met at regular intervals to discuss the particular problems posed by this special population.

**Table 3.2** Staff and tasks.

| | **Three master students** | **Three biomedical laboratory technicians** | **The physician** | **One doctoral student/ the project leader** |
|---|---|---|---|---|
| **Logistic** | | | | **X** |
| **Anthropometric measurements** | | **X** | **X** | **X** |
| **Blood samples** | | **X** | **X** | |
| **Interview** | **X** | | | **X** |

## *3.5 Measurements*

### 3.5.1 Order of measurements

Our experience from the 25 first respondents showed that starting the examination with anthropometric measurements and blood sampling increased the possibility of obtaining a complete data set. Willingness to participate in the anthropometric measurement indicated that the respondent was in a cooperative mood. If the blood sampling was successful, it proved easier to carry out the semi-structured interview and the 24-hour dietary recall.

### 3.5.2 Anthropometric measurements

Weight was measured to the nearest 0.5 kg with a portable electronic scale (Secca®). The average of three measurements was used to compensate for the respondent's unsteadiness, and the results were corrected for the weight of the clothing according to a pre-established procedure (Appendix 2).

The electronic scale was calibrated at least once a week during the periods of data collection using weights with known mass (1 x 5 kg, 2 x 10 kg, 2 x 25 kg).

The height measurements were performed as closely as possible in accordance with WHO standardized methods, with the respondent standing upright with heels together, without bending or stretching, and looking straight ahead, without raising or lowering the head. The Frankfurt plane running between the upper end of the ear and the outer corner of the eye was tentatively kept exactly parallel to the ground (54).

BMI ($kg/m^2$) was calculated and the Mid Upper Arm Circumference (MUAC, cm) was measured in accordance to the procedure proposed by Powell-Tuck . A non-stretch tape measure was used at the mid non-dominant upper arm point between acromion and olecranon. MUAC is considered to be a better predictor of health outcome than BMI, and cut off MUAC was $\leq$ 23.2 cm for men and 23.0 cm for women (55). Clothing difficult to remove and unwillingness to bare the arm reduced the number of respondents who underwent MUAC measurements to N=130.

### 3.5.3 Biochemical analyses

An overview of the biochemical parameters is given in Table 3.3, p. 35. Blood was drawn by the biomedical laboratory technicians or the physician, and treated in accordance with the specifications from the relevant laboratories (Appendix 2).

All the biochemical parameters were analyzed at officially accredited laboratories in Oslo. The Department of Forensic Toxicology and Drug Abuse at the Norwegian Institute of Public Health tested the blood samples from the 25 first respondents for narcotics, speed and alcohol. Serum-C-peptide and the vitamins $B_1$, $B_6$ and C were analyzed at the Department of Medical Biochemistry, Oslo University Hospital Aker, Norway. The other blood samples were delivered to Fürst Medical Laboratories. To assess malnutrition from blood analyses, the data from the drug addicts' biochemical parameters were compared with the reference values from the average healthy Norwegian population, used by the respective laboratories. Further details are given in Figures 5.1 and 5.2 and Papers I-IV.

## *3.6 Semi-structured interview with questionnaire*

The answers to the questionnaire and the 24-hour dietary recall were filled in by the interviewers. The questionnaire about living conditions consisted mainly of questions about present and past, with some open-ended questions added. These were developed on the basis of meetings with health workers in the field and our own conversations and observations of illicit drug addicts in their daily environments. When formulating the questionnaire, meetings were held prior to the start of the study with two illicit drug addicts, one man and one woman, to ensure that they – and the investigators – understood the questions as intended. This information was used to adjust the questions about demographic data, living conditions, food accessibility, drug use and certain health-related topics, and the 24-hour dietary recall. Tobacco smoking was recorded as well. Further details are presented in Appendix 3. Spontaneous remarks by the respondents that were considered to be of potential value were written down for possible later use.

### 3.6.1 Socio-demographic data etc.

The questionnaire included questions about age, educational level, source of income, access to food and use of health care services.

The level of education was determined according to four categories: non completed, primary and lower secondary school, upper secondary school and college/university. There were eight different categories for source of income: social security benefits, disability pension, rehabilitation benefits, financial support from family/friends, begging, break-in/burglary, sex trade/ prostitution, and drug dealing/pushing drugs. Access to food was recorded as "Do you feel that you eat enough food?" Number of visits to health care services center and low threshold centers in the previous three month were registered.

### 3.6.2 Drug habits

Questions about drug habits included the kind of drugs they used to take during the previous month, and the kinds and amounts of drugs taken in the previous 24 hours. They were also asked how they had administrated the drugs, for example through injection, inhalation, snorting or orally intake. Those who reported to use ascorbic acid when injecting, were asked to estimate the amount from models. Age at drug debut and number of years of drugs injection and other drug-related questions were also included in the questionnaire.

### 3.6.3 Living conditions

Housing during the previous month was divided into a number of categories: living in their own home, in sheltered housings, with family/friends, in an occupied house, sleeping rough, admitted to accident and emergency department or institution, and others. This was an open-ended question.

Institutionalization in the previous 12 months was registered in terms of number of days in: 1) a treatment institution, 2) prison, 3) a somatic hospital, 4) a psychiatric hospital and 5) others. Fourteen days is probably the shortest time period in which changes in diet result in a noticeable alteration in nutritional status, so the cut-off value for the number of days in an institution was 14 days. This was used in statistical calculations to study if institutionalization had impact on nutritional status.

### 3.6.4 Dietary assessments

One single 24-hour dietary recall was carried out to assess food consumption and nutrient intake. The respondents were first asked about the last food intake before the examination to facilitate the process of memory, after which the interviewer helped them remember gradually backwards in time. To support recall, photos of food items and dishes had been taken at various locations that offered food to illicit drug addicts, including the Salvation Army's Soup Bus and the Pro Centre. Samples of plates, cups and glasses in different shapes and sizes from actual kitchens were used to estimate food amounts. Pictures of sweet food items were used as reminders. The time of the food intakes were recorded to assess the frequency of eating events/meal patterns.

The energy and nutrient content of the food items was based on the Norwegian Food Composition Table (56). The software program FoodCalk (57) was used to assess amounts and type of food, and the contents of energy, macronutrients, micronutrients and fiber. Added sugar was assessed in terms of the sucrose present in jam, soft drinks, cakes, ice cream, and chocolate as well as sugar added to coffee and tea or sprinkled on cereals.

## *3.7 Data entry and calculations*

All data from the first 25 drug addicts were entered and calculated in January 2002. In October 2002 the data set totalled 167 participants and calculations were made for an intermittent presentation of the results. In May 2003 the final data entry was done and to reduce data entry error the data was plotted twice, and deviations were investigated and corrected. Data were analyzed using the statistical software program SPSS (SPSS Inc., Chicago, IL, USA) version 13 (Paper I), version 14 (Paper II) and version 20 (Papers III and IV).

**Table 3.3** Variables and variable distributions* used in the Papers I – IV.

| ***Variables*** | Variable distributions in Papers | | | |
|---|---|---|---|---|
| | I | II | III | IV |
| ***Anthropometric measurements etc.*** | | | | |
| Height | N | | | |
| Weight | N | | | |
| MUAC (not AMC) | N | | N | C† |
| BMI | N/C†‡ | | nN | C† |
| PALei | | C | | |
| ***Interview demographics etc.*** | | | | |
| Gender | C | C | C | C |
| Age | N | N | N | N |
| Self-reported drug use | C | C | C | C |
| Ways of drug administration | | | C | C |
| Ascorbic acid injected (amounts) | | | nN | |
| Years injecting drugs | N | | N | N |
| Educational level | C | | C | C |
| Sources of income | C | | C | |
| Type of housing | C | | | C |
| Days institutionalized | nN | | nN | |
| Access to food | | C | C | C |
| Preparing hot meals | C | | | |
| Sweet taste preference | | C | | C |
| Abscess infected | | | C | C |
| ***Dietary assessment – one 24-h recall*** | | | | |
| Food items/-preferences | | C/N | nN | |
| Energy intake (<9kcal=C) | | N | | nN/C |
| Macro nutrients | | N | nN | nN |
| Micro nutrients | | nN/C† | nN | nN |
| Number of eating event | N/C | | nN | nN |
| Food providers | | C | | |
| ***Biochemical analyses*** | | | | |
| S-CRP | N/nN/C‡ | | nN | nN |
| B-Hb | N/nN/C† | | | C† |
| S-Ferritin | N/nN/C† | | | C† |
| S-Albumin | N/nN/C† | | | |
| S-C-peptide | | N/C‡ | C‡ | |
| B-HbA1c | | N/C‡ | C‡ | |
| S-Folat | | | nN | |
| S-$B_{12}$ | | | nN | |
| S-$B_6$ | | | nN | |
| P-tHCY | | | nN/C‡ | |
| S-MMA | | | nN | |
| S-25-Hydroxy-vitamin $D_3$ | | N/C† | nN | |
| S-Retinol | | N/C† | | nN |
| S-Tocoferol | | N/C† | | nN |
| S-Selenium | | N/C† | | nN |
| S-Zink | | N/C† | | |
| S-Copper | | N/C‡ | | |
| S-Ascorbic acid | | N/C† | nN | |
| B-Thiamin | | N/C† | | nN |
| S-Triacylglycerol (TAG) | | N/C‡ | | |
| S-Total cholesterol | | N/C† | | |
| S-HDL cholesterol | | N/C† | | |
| S-LDL cholesterol | | N/C† | | |
| S-Helicobacter Pylori lgG | | | C | |
| S-HBsAg (Hep. A) | C | | C | |
| S-Anti-HBc/-HBs (Hep. B) | C | | | |
| S-Anti-HCV (Hep. C) | C | | C | C |
| HIV/AIDS (STI) | C | | C | |

*N= normally distributed, nN= not normally distributed and C = categorical data.

†< reference value(s)

‡> reference value(s)

### 3.7.1 The sample size, and gender and variable distributions

The data set consisted of 123 men and 72 (37 percent) women, but was not complete for the whole sample. This explains why different numbers (N) appears in the tables in this work. For applied variable distribution see Table 3.3 previous page. Data from men and women were included in the same analyses where no gender difference was observed (Papers II, III and IV). The categorical variables presently being infected with abscesses or not, and regular use of heroin or not, appear as dependent variables in Papers III and IV respectively. Most of the categorical variables with more than two categories were transformed onto two categories.

**Table 3.4** Statistical analyses used in the papers.

| Papers | Tests | Outcomes |
|---|---|---|
| I | Student's t-test<br>Mann-Whitney U-test<br><br>Pearson's test<br>Spearman's test<br><br>Multiple linear regression analyses | Difference between groups<br><br><br>Correlations<br><br><br>Associations between several variables |
| II | Student's t-test<br>Mann-Whitney U-test<br><br>Pearson's test<br>Spearman's test | Difference between groups<br><br><br>Correlations |
| III | Student's t-test<br>Mann-Whitney U-test<br>Pearson's Chi-Square test<br>Fisher's exact test<br><br>Spearman's test | Difference between groups<br><br><br><br><br>Correlation |
| IV | Student's t-test<br>Mann-Whitney U-test<br>Pearson's Chi–Square test<br>Fisher's exact test | Difference between groups |

### 3.7.2 Statistical analyses

In descriptive statistics the parameters are presented as mean (SD) and median (min-max) in Paper I, and as mean (SD) or median (P5-P95) in Paper II, and as mean (SD) or median (P25, P75) in III and IV. Frequencies/rates are presented as n percent (Paper I, III and IV).

Parametric tests were performed for normally distributed data, while non-parametric tests were used for not normally distributed data. Chi-Square tests were used for categorical data, see Tables 3.3 and 3.4. P-values $\leq 0.05$ were considered significant.

### 3.7.3 Treatment of missing data

There were several reasons for missing data: respondents who could not or would not answer all questions during the interview, unwillingness or inability to participate with the anthropometric measurements and blood drawings, and a few times a biochemical laboratory was unprepared to handle hepatitis virus contaminated samples.

In this study all the respondents were left in the data set and included in the calculations where data were obtained. The different numbers of responses were included in statistical calculation and interpreted according to procedures of discussion given in 5.1 Methodological issues.

# 4 RESULTS

The main results of the four papers included in this thesis are presented in the following section.

## *4.1 Paper I*

### Living as a drug addict in Oslo, Norway - a study focusing on nutrition and health.

Saeland M, Haugen M, Eriksen FL, Smehaugen A, Wandel M, Böhmer T, Oshaug A. Public Health Nutr. 2009 May;12(5):630-6.

This paper presents the results from the assessment of nutritional status and related living conditions among illicit drug addicts in Oslo, including drug history, education, source of income, housing and number of eating events, in addition to drug related and sexual transmitted infections (STI).

The mean age for the 123 men was 36.2 (SD 7.0) years and 34.5 (SD 7.4) years for the 72 women. Most had started with drugs in the mid-teens and had used drugs for about 15 years. Heroin was used by 72 percent of the men and 78 percent of the women, often in combination with Rohypnol and benzodiazepine. Amphetamine and hashish/ cannabis also were frequently used, and abuse of Methadone occurred.

Moderately underweight ($16.5 < BMI < 18.5$ kg/m$^2$) was detected in 20 percent of the female drug addicts, and severely underweight ($BMI \leq 16.5$) in 7 percent. Only 3 percent of the male drug addicts were assessed as moderately underweight and non as severely under-weight. Overweight ($BMI > 25$) was found in 22 percent of the women and 14 percent of the men. BMI was positively associated with number of eating events the past 24 hours and with days in institution the previous 12 months. The drug addicts who reported to have slept rough the past month had significantly reduced BMI compared to those who had stayed in hospice, lodging or night shelters. The concentrations of haemoglobin, serum ferritin and albumin supported a higher prevalence of malnutrition among the women. Hepatitis C infection was detected in 85 percent equal both genders, active hepatitis B in 6 percent men only, and less than 2 percent were HIV positive, also men. Eight percent of the men and 12 percent of the women had not completed any education. Public financial support was received by 85

percent , 38 percent of the women had prostitution as a significant income source, while burglary was most prevalent among the men rating 26 percent. Dealing with drugs (pushing drugs) was reported by 20 percent of the respondents in the study. The majority had no fixed abode.

The drug addicts suffered from malnutrition and chronic infections independent of drug history, education and income.

### *4.2 Paper II*

## High sugar consumption and poor nutrient intake among drug addicts in Oslo, Norway.

Saeland M, Haugen M, Eriksen FL, Wandel M, Smehaugen A, Böhmer T, Oshaug A. Br J Nutr. 2011 Feb;105(4):618-24.

This paper describe the results from investigation of the dietary habits of illicit drug addicts with focus on access to food, food preferences, energy and nutrient intakes, and related concentrations of biochemical blood analyses.

Limited access to food was reported by 64 percent of the drug addicts, due to lack of money, and 11 respondents had not eaten the past 24 hours. Only 38 percent of the men and 20 percent of the women reported homeostatic eating, corresponding to PALei values between 1.2 and 2.2. Nearly 70 percent bought most of the food themselves; while a third claimed family/friends and charitable organizations as their main food providers. Some also told that they had gotten food through theft from grocery stores or they had found it in garbage bins. Sandwiches and snacks were the most frequently used food items. The women had a high preference for snack meals, while men had dinner more often. More than 60 percent of the addicts reported a special preference for sweet food items. Sugar sweetened soft drinks and bread/cereals were consumed by 65 percent of the drug addicts on the day of investigation. Intakes of vegetables, fruit and fish were reported by less than 30 percent. Daily energy intake varied from 0 to 29.4 MJ and 0 to 37.0 MJ for women and men respectively with mean intakes corresponding to 6.8 MJ (SD 5.3) for the women and 9.2 MJ (SD 5.6) for the men. Added sugar accounted for 30 percent of the energy in total. Intakes of

micronutrients were below the recommendations for 55 – 100 percent of the drug addicts. Results from the biochemical analyses supported the findings of an unsatisfactory diet, with 32 percent of the drug addicts having tri-acyl-glycerol (TAG) concentrations above the reference values, and 35 percent with total cholesterol concentrations below the reference values.

The drug addicts' food choice was monotones. The dietary intakes of energy and nutrients represented a health risk, and this was reflected in the concentrations of the biochemical blood analyses.

### *4.3Paper III*

### Abscess infections and malnutrition – a cross-sectional study of poly drug addicts in Oslo, Norway

Saeland M, Wandel M Böhmer T and Haugen M

This paper focused on frequency of abscess infections addressing poly drug addicts relative to malnutrition.

Abscess infections were reported by 25 percent of the poly drug addicts, 19 percent of the men and 33 percent of the women (P=0.025), who were significantly more exposed to malnutrition (BMI<18.5 $kg/m^2$) than those reporting non-abscess infected (P=0.001)**.** The abscess infected reported fewer meals, lower intakes of fruits and vegetables, lower energy percentage from protein and higher energy percent from sugar. They also had lower total intakes of vitamin D, $B_1$, $B_6$, $B_{12}$, folic acid and vitamin C than the non-abscess infected group. These groups differed significantly with respect to S-25-hydroxy-vitamin $D_3$ (P=0.021), S-C-peptide (P=0.029), B-HbA1c (P <0.05) and P-tHCY>15 µmol/l (P=0.001), indicating poorer nutritional status, and higher metabolic stress and inflammatory activity in the abscess infected group.

Abscess infections were reported in 25 percent of the poly drug addicts. Dietary, anthropometric and biochemical assessments indicated a relation between abscess infections and malnutrition.

### *4.4 Paper IV*

## Heroin use and nutritional status in poly drug addicts in Oslo, Norway

Saeland M, Haugen M, Wandel M and Böhmer T

This paper intended to explore the effect of regular use of heroin compared with abuse of other drugs addressing nutritional status in poly drug addicts.

In this cross-sectional study of 195 poly drug addicts, 80 percent of the respondents used heroin on a regular basis, and they had injected for a longer period than those regularly using other drugs (similar figures for men and women). Underweight (BMI<18.5 $kg/m^2$) was almost five times more prevalent among the heroin addicts than those using other drugs (P=0.052). Limited access to food was more frequent (P =0.011), number of eating events fewer (P=0.021) and intake of added sugar was a more prominent part of the diet to those using heroin than those using other drugs. Haemoglobin below references was most prevalent among those using heroin (P=0.014), and S-Selenium was lowest in the women using heroin and below reference (P<0.001).

Poly drug addicts using heroin regularly may have a poorer nutritional status than poly drug addicts regularly using other illicit drugs, affecting both men and women.

# 5 DISCUSSION

Measurements of nutritional status are usually valuable inasmuch as they may be predictive of health outcome. The overall aim of this thesis was to assess the dietary habits and the nutritional status among illicit drug addicts. Few surveys of drug addicts have been carried out during periods of unrestricted abuse. The present study was indented to investigate as far as possible drug addicts living outside a treatment setting or an institution. This approach posed a number of difficulties, not least regarding the accessibility and representativeness of the respondents.

No measurements of diet will provide the absolute truth about food consumption and nutrient intake. Dietary assessments or anthropometric measurements alone are not sensitive indicators of malnutrition. Therefore biochemical analyses of vitamins, minerals and related nutrients additional to anthropometry and dietary assessments in general, are important instruments in assessing nutritional status (58). The irregular food habits, maldigestion and edemas or dehydration, as complications to drug addiction (21, 59) constitute additional limitations. Though, the lack of especially adapted methods for investigating nutritional status in drug addicts must be kept in mind when interpreting the results.

## 5.1 Methodological issues

Epidemiologic studies are prone to errors since they do not take place under controlled conditions (58).

The ideal design for the present study would have been to investigate a random sample of drug addicts living in Oslo over a sufficiently long time period to assess their nutritional status. However, making contact with the same respondents several times for a longitudinal study would be very difficult due the lack of predictability. Therefore a cross-sectional design, where recruitment, inclusion, measurements and interviews were carried out in one single cession, was used. The design is also cheaper and less time-consuming than longitudinal studies. Cross-sectional design can be compared with taking a snap-shot of the measured parameters from each respondent. These studies are useful for generating hypotheses, but not suited to confirming causality (58).

### 5.1.1 Validity

A study is considered to be valid if the findings portraits the true situation in a reasonable way, and if it really measures what it is intended to measure (60).

#### *5.1.1.1 Representativeness (external validity)*

We were unable to evaluate the representativeness at the time of recruitment, since the respondents were continually being distracted by other events that competed for their attention. Thus, the individual respondent's degree of alertness and willingness to participate determined the final 50 percent inclusion rate from those recruited (Figur 3, p. 29), making this a strategic sample. Generalization from strategic samples into statistical general meaning cannot be done due to lack of a random selection procedure (61).

The fact that the sampling was carried out in many different locations may have increased the representativeness. Those who were staying in sheltered housing, a hostel or a night shelter were more accessible, than those who lived on the streets and in outdoor locations. The rewards we gave out in the form of cigarettes and food were obviously a strong motivating factor for most of the respondents. However, the worst off addicts (see 3.3.1, pp. 27 and 28) may not have been included in this study, which could mean a more positive picture of dietary habits and nutritional status among the addicts than what was the real picture.

### 5.1.2 Internal validity

The internal validity of a study is concerned with the data sampling, data processing and interpretation and presentation of the results. Detection of systematic errors (bias) and random error (chance) are key elements of the validation (60).

### 5.1.3 Data sampling

The drugs reported used during the past 24 hours were validated through detection of type of drugs in the blood samples from the 25 first respondents. A 98 percent match between their responses and the blood test results indicated that the addicts were able to recall the drug abuse, strengthening the internal validity. The fact that the respondents were under influence of heavy drugs during the examination, made the data sampling with regard to anthropometric measurements more prone to chance,

weakening the intern validity. On the other hand, the respondents' unsteadiness may be regarded as a validation of the fact that they really were intoxicated (representativeness). The anthropometric measurement weight and height were thus encumbered with chance due to respondents' variable ability to stand still and upright.

The anthropometric measurement MUAC may have been affected by random error, through skin infections and swelling of upper arm. The number of respondents whose MUAC was measured (N=130) was lower than for BMI (N=192), due to unwillingness to bare their arms. Of the respondents who reported abscess infection, 54 percent did not bare their arms for MUAC measurements, while among those who did not report abscess infection 28 percent did not bare their arms. The difference was statistically significant (P=0.004, Fisher's exact test due to small numbers in the groups). This means that the MUAC values may be somewhat biased.

The blood volume for biochemical analyses was incomplete due to clogged veins, or interruption of the examination due to acute illness. This can have contributed to chance errors in the biochemical data.

The performance of anthropometric measurements and blood sampling prior to the interviews and the 24-hour recall (see 3.5.1, p. 31), gave us an opportunity to establish good contact with the drug addicts, which probably added to internal validity by reducing information biases. During the measurements we had time to talk to the participants and calm them down or make them more alert, where appropriate. Those from whom we did not obtaining blood samples, could be excluded from the subsequent examination step. This may have reduced validity excluding some addicts who had been injecting more frequently or for a longer time. However, totally, this procedure probably resulted in more usable data for further processing.

Dietary data were obtained from one single 24-hour dietary recall. The data on the recalls were collected at all seasons of the year, on all days and at different times of the day and at night matching the drug addicts' variable circadian rhythms. This approach probably removed the effect of day-to-day variations (62), and resulted in a larger number of respondents, allowing us to analyze the data at group level (58).

The respondent's short-term memory may have been a source of errors (chance). Most people tend to underestimate their food intake (63, 64), and we do not know how this is handled by drug addicts. The respondents' low body weight compared with that of the normal population (65) supports the finding of low energy intake. Anecdotal information from health personnel who had long experience of working with drug addicts, indicated that this group may well overestimate their food intake in order to appear less influenced by their addiction than they really are, which may explain the huge variation in assessed food and energy intake in our study, from 0 to 37 MJ for the men and 0 to 29.4 MJ for the women. The energy intake may be subject to random errors, but the tendency towards a large variation in food intake is likely to be representative for drug addicts living outside a treatment setting or institution, since they are believed to engage in opportunistic eating (66).

Preparations for the food interviews described under methods (see 3.6.4)
were done to reduce information bias and chance in the 24-hours dietary recall.

The self-reported responses deserve special attention. For instance, information on the frequency of abscess infections was based on self-reported information in both our and in other studies (67, 68). In one of these the participants were asked to report the number of times they ever had a skin infection in the past, using ranges (67). In the present study we asked: "Do you have any abscesses now?" Our question therefore focused more closely on the respondent's current state of health. It is likely that most of those who reported abscesses responded affirmatively, since the pain and the suffering caused by an abscess makes it easy to recognize and difficult to ignore. This may have strengthened the validity.

The positive correlation between reporting abscess infections and visits to a medical care centers to have the dressing changed (Paper III), supported the respondents' statement about their abscesses. These two questions were asked separately in the questionnaire in an attempt to control for information bias.

Information about education, source of income, residence during the previous month and other demographic data were obtained through interviews. We were not able to verify the information, which may therefore be subject to random errors.

### 5.1.4 Data processing

When choosing statistical methods for analyzing the data in this study, the limitations of the cross-sectional design, and the distributions of the data were taken into account to safeguard the validity (Tables 3.3 and 3.4, pp. 35 and 36).

The specificity and sensitivity of the methods used for the biochemical analyses may be influenced by the presences of drugs or drug metabolites and levels of nutrient-related parameters outside the normal reference range, factors that cannot be controlled for. In the analyses including vitamin S-$B_6$, S-Folate, P-tHCY, S-MMA and S-$B_{12}$ responses with CRP>10 mg/l were excluded in an attempt to reduce the impact of inflammations and improve the specificity for these biochemical analyses (69).

All data entry was done twice, and errors corrected to improve validity. Any information bias in the Norwegian official database (56) are outside our control.

### 5.1.5 Interpretation

Freely from Malterud "A view from nowhere does not exist" (70). All interpretations are influenced by the interpreters' ideologies and interests. The fact that I met, shook hands and talked to most of the respondents at least for 45 minutes, influenced my attitudes and could have colored my interpretation.

Age, education and smoking tobacco were potential confounders in this study. It is normal in western society for people to gain weight with increasing age more so for men than women (65). We found that this tendency also applied to our respondents (Paper I). The drug addicts' own explanation for this phenomenon was that the ability to survive as a drug addict improves with age, and that those who lack this ability probably do not live very long.

The educational level was generally low among the respondents, and all reported smoking tobacco, therefore both these factors did probably not act as confounders in this study.

### 5.1.6 Presentation

The overall focus on statistical significance in the presentation of the results in this study, (as in scientific presentations in general), may weakening the validity of the study, as results not reaching statistical significance also may be relevant in the drug addicts rapidly changing life. Besides, significance depends on the size of the sample, and may be difficult to reproduce (61).

**Summing up**

The results from this cross-sectional study do not have external validity due to the strategic sample. The strength of the study is that the dietary, anthropometric and biochemical data were collected at the same time. The findings may act as basis for generating hypothesis, comparison to other studies, and inspiration for future studies of similar populations involving illicit drug addicts.

## *5.2 Discussion of results*

The tables of results presented in this chapter are new, and have been created especially for this document, to expand upon the perspectives presented in the four papers.

Both food and drugs influence the body's hormonal and metabolic responses, and drug abuse is also known to interact with food intake (71, 72). In the absence of a control group, the present discussion is based on references for clinically healthy subjects (73) and nutritional recommendations for the general Norwegian population (74).

During the data collection, the drug addicts often spontaneously commented on and were concerned about their nutritional status. One male respondent exclaimed: "Actually, I am eating decent amounts of food, but it seems as though it passes straight through me and little is utilized." Nevertheless, this discussion covers dietary habits and nutritional status, with a particular focus on food accessibility and intake, as well as indicators of malnutrition.

### 5.2.1 Access to food and demographics

The subjective feeling of not obtaining enough food is considered a severe manifestation of food insecurity, and is usually reported among poor populations in developing countries (75).

**Table 5.1** Access to food, drug habits and demographic factors.*

| | **Limited access to food N=124** | **Content with access to food N=69** | **P-value** |
|---|---|---|---|
| Gender Male/Female n % | 65/35 | 60/42 | 0.311 |
| Age years | 35 (30, 40) | 36 (30.5, 42) | 0.179 |
| Injecting drugs years | 13 (7, 20) | 12 (3, 19) | 0.234 |
| **Educational level** | | | |
| - None completed n % | 11 | 8 | 0.071 |
| - Primary and secondary school n % | 59 | 74 | |
| - Upper secondary school n % | 28 | 18 | |
| - College/university n % | 2 | - | |
| - Number of years in school | 11.0 (9, 12) | 10.5 (9, 12) | 0.777 |
| **Regular drug use** | | | |
| - Heroin n % | **86** | 71 | **0.011** |
| - Rohypnol n % | **73** | 62 | **0.018** |
| - Benzodiazepines n % | 27 | 33 | 0.388 |
| - Amphetamine n % | 44 | 52 | 0.250 |
| - Hashish/cannabis n % | 41 | **59** | **0.012** |
| - Drug injection n % | **91** | 80 | **0.025** |
| **Source of income** | | | |
| - Social security benefits n % | 64 | 30 | 0.073 |
| - Disability pension n % | 20 | **30** | **0.049** |
| - Rehabilitations benefits n % | 4 | 7 | 0.195 |
| - Family/friends n % | 5 | **7** | **0.038** |
| - Begging n % | 7 | 4 | 0.390 |
| - Break-in/burglary n % | 26 | 12 | 0.270 |
| - Prostitution n % | 16 | 13 | 0.146 |
| - Drug dealing n % | **27** | 12 | **0.009** |
| **Type of housing** | | | |
| - Own home n % | 30 | 25 | 0.575 |
| - Hospice, night-shelter etc n % | **57** | 38 | **0.026** |
| - Rehab/treatment n % | 9 | **23** | **0.006** |
| - Acute ward n % | 2 | 3 | 0.841 |
| - Friends and family n % | 11 | **22** | **0.052** |
| - Sleeping rough n % | 8 | 10 | 0.625 |

* Median (P25, P75) if no n % is given.

We found no differences between those reporting limited access to food and those being content with their food supply in terms of gender, age, number of years injecting drugs, and educational completion. However, regular use of heroin and Rohypnol, drug injection, dealing drugs as a source of income and staying in hospices/night-homes in the past month probably had a negative impact on access to food. Smoking hashish/cannabis, receiving disability pension, recently participating in treatment or rehabilitation programs and staying with family/friends were positive factors for food accessibility (Table 5.1).

Usually, food security increases with higher levels of education (76). We found that the majority of the respondents had completed lower secondary school, but not upper secondary school or any higher education (Paper I). This relatively uniform, low level of education compared to the general Norwegian population may explain why education did not influence access to food. Similar results was seen in a cross-sectional Canadian study of injection drug users, where educational level was not related to food security (15).

#### *5.2.1.1 Limited access to food and demographics*

The majority of the respondents reported limited access to food. Heroin and Rohypnol were most prevalently used, and poly drug use may potentiate the harmful and dangerous effects from drugs (49). In the Canadian study mentioned above it was found that money spent on drugs, influenced food insecurity, as did injecting drugs (15). Generally, more money spent on drugs probably means less money spent on food, at least in the low-income groups low-income groups (20).

Drug dealing decreased access to food. This kind of activity usually carries high risks, like insecurity related to delivery and distribution, and failure to safety creditors may be a life-threatening situation (45). This might have had an impact on the food supply for those pushing drugs.

No food enjoyment was reporting by 54 percent of the men using heroin regularly, compared to 19 percent of the men who used other drugs, p=0.005 (Paper IV). It is known that heroin use is associated with lower interest in food (77). Motivation is closely linked to expected rewards (10), and seeking food is probably displaced by the hunt for drugs due to the higher expected rewards from drug use.

In the study from Vancouver, Canada, 64.7 percent of injection drug users (IDUs) reported hunger due to inability to afford food (15). This finding is entirely consistent with the situation in Norway, and shows that food insecurity is common even in affluent countries/societies. The situation in a potentially relevant Puerto Rican study is not quite comparable maybe due to the study's exclusive focus on women in low-income households (20).

Most of the drug addicts in our study were homeless, and those who stayed in hospices and night shelters reported more limited access to food, telling us that servings of more than one daily meal, if any, in the lodgings were rare. Abscess infections were more prevalent among those who stayed in hospices than among residents of other types of housing, may be due to higher food insecurity. Food insecurity was also found to be associated with unstable housing in the Canadian study (15).

#### *5.2.1.2 Contentment with access to food and demographics*

In our study smoking hashish/cannabis related with food supply contentment. Other have documented that hashish/cannabis improves appetite (78) and that use of this drug probably functioned as a food reminder to the users. According to David Nutt it is better in health terms to consume hashish/cannabis rather than heavier drugs like heroin and cocaine, as it is less addictive and less harmful to body and mind, and the risk of overdose death is negligible (79).

The receipt of a disability pension and money from family and friends improved access to food (Table 5.1). Disability pensions are usually significantly larger than social security benefits. The stability of this financial support was probably an essential factor, and during data collection we registered that addicts looked forward to spend their disability pension on food. Beer was among the food suggested as being healthy.

Respondents who had recently undergone drug-related rehabilitation and/or received treatment implying regular meals, and/or who stayed with friends and family, reported better access to food. Other have found resembling results investigating heroin users (80). The Canadian study concluded that IDUs may benefit from improved access to drug treatment services that also improve food security (15).

Several respondents told us spontaneously that they considered food service centers opening hours not to be adapted to the drug addicts' circadian rhythms, which often involve night "work". One solution was to take drugs to ease hunger, because hunting for food would probably be unsuccessful. Irregular meal patterns may influence motivation and emotions, and thus increase focus on drugs rather than food (81).

### 5.2.2 Access to food and nutritional parameters

Limited access to food related with underweight (BMI<18.5), low food intake (PALei≤1.2), hyper-homo-cysteinemia (HHCY) and total cholesterol (T-cholesterol) below reference value. Contentment with access to food was related to more cooking activity, more eating events, higher intake of fruit and cereals per 10 MJ, higher dietary density of protein (E %), and higher BMI values (Table 5.2).

**Table 5.2** Access to food relative to dietary, anthropometric and biochemical parameters, and infections.*

| | **Limited access to food N=101 – 123** | **Content with access to food N=48 - 69** | **P-value** |
|---|---|---|---|
| Preparing warm meals times/month | 2 (0, 10) | **4 (0, 12)** | **0.006** |
| Number of eating events | 2 (1, 3) | **3 (2, 4)** | **<0.001** |
| Buying most of the food themselves n % | 46 | 54 | 0.711 |
| Special preference for sweet food items n % | 65 | 58 | 0.438 |
| Fruit g/10MJ | 0 (0, 61) | **28 (0, 337)** | **0.013** |
| Cereals g/10MJ | 101 (0, 224) | **152 (65, 288)** | **0.017** |
| Vegetables g/10MJ | 0 (0, 60) | 0 (0. 80) | 0.334 |
| Fish g /10MJ | 0 (0,0) | 0 (0, 13.4) | <0.001 |
| Added sugar E % | 26 (15, 40) | 24 (12, 35) | 0.530 |
| Protein E % | 9.8 (6.4, 14.0) | **12.7 (9.0, 14.4)** | **0.047** |
| Fat E % | 27 (17, 36) | 30 (18, 37) | 0.290 |
| Carbohydrates E % | 57 (49, 70) | 58 (47, 70) | 0.643 |
| BMI kg/m$^2$ | 20.0 (19.3, 23.7) | **22.3 (20.7, 24.8)** | **0.010** |
| BMI<18.5 kg/m$^2$ n % | **16** | 6 | **0.050** |
| MUAC cm | 26.0 (23.5, 28.5) | **26.0 (24.0, 28.5)** | **0.050** |
| MUAC < ref n % | 24 | 15 | 0.246 |
| PALei≤ 1.2 n % † | **60** | 39 | **0.016** |
| HHCY n % ‡ | **56** | 43 | **0.033** |
| T-cholesterol < ref n % ♯ | **45** | 27 | **0.019** |
| Abscess infections n % | 29 | 18 | 0.097 |
| Hepatitis C/AntiHCV n % | 85 | 84 | 0.786 |

*Presented as median values (P25, P75) if not n % is given.

†Physical activity level (PALei) (energy intake/basal metabolic rate) illustrate the range of energy intakes; PALei≤1.2 corresponding to low energy intake/ bed rest (Paper II).

‡ Hyperhomocysteiemia (P-tHCY>15 µmol/l (Paper III).

♯ Ref T-cholesterol: M<3.6, F<3.9 mmol/l.

#### *5.2.2.1 Limited access to food and nutritional parameters*

Studies from abroad have reported generally low intakes of fruit, vegetables and proteins by illicit drug users (21, 77) probably as a result of irregular living conditions. This was also a general problem in our study, most widespread to those reporting limited access to food, among whom 60 percent had low energy intake corresponding to bed rest (PALei≤1.2) (Table 5.2). Other studies have confirmed increasing concentrations of homocysteine to be associated with decreasing intakes of folic acid through fruit, vegetables and cereals, and intake of protein (82-84). More prevalent HHCY (P-tHCY>15 μmol/l) among those that reported limited access to food in our study, support lower intakes of fruit, vegetables, cereals and protein.

#### *5.2.2.2 Contentment with access to food and nutritional parameters*

Approximately 40 percent of the respondents never prepared a hot meal despite access to facilities for both food storage (>85%) and cooking (>80%) (Paper I). Cooking and grocery shopping are practical skills that one may have learned - or not. According to Johansen A.B. et al (2012) drug addicts could also benefit from skills development, which can give them a more life-sustainable identity (85). Improved cooking skills would probably increase access to food, and can also provide a practical repertoire of recipes. In this way addicts may choose a diet with a relatively high amount of fruit, cereals, fish and protein. Preparing tasty food that can be enjoyed by others may help a drug addict to make acquaintances for reasons other than dealing drugs (86), thus potentially improving his or her social life (87), another important motivational factor in recovering from drug addiction.

### 5.2.3 Dietary intake

Food choice was generally monotonous, and less than 30 percent of the respondents had eaten vegetables, fruit or fish during the previous 24 hours. Food items that were easy to chew and had a high content of added sugar were the major dietary elements (Paper II). The drug addicts who had abscess infections or used heroin regularly, had a higher energy percentage (E %) from added sugar, not different to genders (Papers III and IV), and accordingly a lower dietary content of fiber and essential nutrients (88). Other studies have identified an increased craving for sweet taste among heroin addicts (89). Sugar stimulates the endogenous production of endorphins, which

declines during regular drug use (9, 90). This may explain the high preference for sweet foods.

**Table 5.3** The drug addicts' intakes of nutrients per 10MJ compared with Norkost2.

| | **Male N=116** Mean (SD) | **Female N=68** Mean (SD) | ***Norkost2 M/F*** | ***N%<Norkost2* M/F*** |
|---|---|---|---|---|
| Fiber g/10MJ | 14.0 (9.7) | 12.1 (8.3) | 24/27 | 85/98 |
| Calcium g/10MJ | 0.784 (0.544) | 0.899 (0.618) | 1.0/1.1 | 68/60 |
| Iron mg/10MJ | 8.3 (5.2) | 7.8 (7.8) | 11.5/12.2 | 75/88 |
| Retinol eq. mg/10MJ | 0.552 (0.475) | 0.689 (0.625) | 1.5/1.9 | 93/93 |
| Vitamin D µg/10MJ | 2.2 (4.1) | 2.1 (2.8) | 5.3/4.9 | 93/86 |
| Thiamine mg/10MJ | 1.1 (0.67) | 1.0 (0.77) | 1.5/1.6 | 74/90 |
| Riboflavin mg/10MJ | 2.0 (1.56) | 2.2 (2.57) | 1.9/1.9 | 61/62 |
| Vitamin C mg/10MJ | 55.3 (2.9) | 63.1 (95.4) | 115/152 | 84/86 |

***** N%<Norkost 2 means percentage of drug addicts with intakes below Norkost 2.

Assuming that these snapshots (one 24-hour recall) of nutrient intakes portraits the true intake in a reasonable way, the drug addicts interviewed in Oslo seem to have a poor dietary intake resembling that of drug addicts' from other countries (91, 92). The respondents' diet was far from being as nutrient dense as that of the general Norwegian population (Table 5.3, (93)). The food they received from food providers was more nutrient dense than the food they bought themselves (Paper II). This suggests that addicts will benefit from dietary assistance, if the goal is to give them a diet similar to that of the Norwegian population in general.

### 5.2.4 Malnutrition

Malnutrition is usually a composite syndrome of multiple nutrient deficiencies (22). Metabolic disturbances, for instance those assessed by B-HbA1c and S-C-peptide, may be related to a generally high intake of added sugar and insulin resistance caused by the use of opiates and/or chronic infections (11, 94). The interaction of malnutrition and metabolic disturbances complicates the diagnostic picture. However, the intake of food and food supplements is always a vital factor in malnutrition. No one can survive without a supply of food.

Figures 5.1 and 5.2 illustrate some tendencies in the results from the anthropometric measurements and biochemical analyses in this study. Reference values for the normal Norwegian population are adapted as cut-off values. The height of the columns in Figure 5.1 represents male and female respondents with vitamin concentrations below references. Apart from vitamin D, it seems like the female addicts more frequently had values below references than the male addicts. Correspondingly Figure 5.2 illustrates that for anthropometric and metabolic parameters 3 percent to 41 percent of the drug addicts fell below the reference values, while 12 percent to 53 percent had values higher than the reference values. Together the figures illustrate that malnutrition and metabolic disturbances are more frequent among drug addicts than among the general Norwegian population, and that female addicts were probably the most exposed as reported in Papers I-IV.

Our findings are supported by several other studies of drug users, which document that food insecurity and malnutrition are related, occurring most prevalent among multiple drug users (15, 91).

**Figure 5.1** Vitamin concentrations below references.

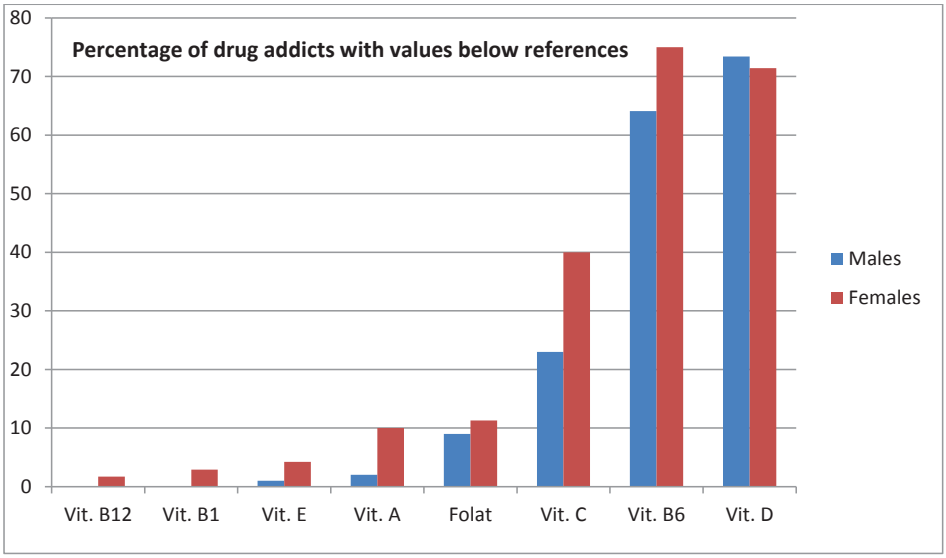
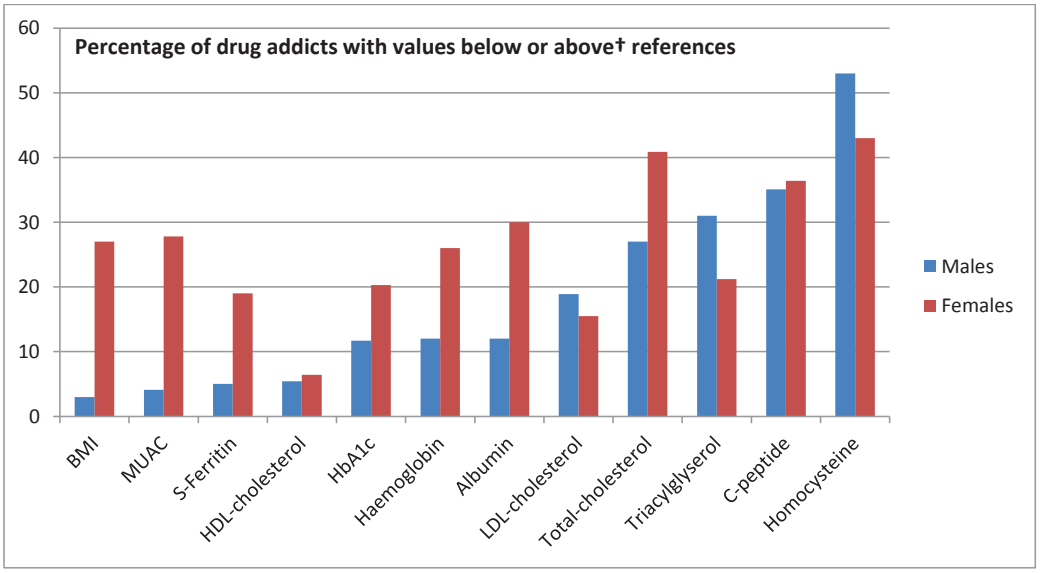



**Figure 5.2** Anthropometric and metabolic parameters deviating from references.




† HbA1c, Triacylglycerol, C-peptide and Homocysteine.

#### *5.2.4.1 Dietary habits and nutritional status among female addicts*

There were no reported gender difference regarding access to food, but dietary habits and nutritional status indicated that the female addicts were malnourished more frequently than the male addicts, a finding that is confirmed in other studies (95). This may be explained by poorer dietary intakes, greater harm from drug abuse and a higher frequency of infections than among men, indicated in Papers III and IV and in the Figures 5.1 and 5.2.

Why are women more exposed to malnutrition than men? In other studies females have been reported to be more sensitive to the rewarding effects of drug abuse than males, and therefore developing addiction more rapidly and being more vulnerable to malnutrition than men. Estrogen is supposed to be the major factor that underlies these sex differences (96, 97). The women in our study took higher doses of Rohypnol than the men, but there was no difference in the use of heavy drugs (heroin, amphetamine etc), although the men used more hashish/cannabis. The fact that the female addicts had lower BMI and higher frequency of underweight, may explain some of the gender differences, as may the fact that 38 percent of the female drug addicts worked as prostitutes, compared to only 2 percent of the men (Paper I).

## *5.3. Conclusion*

The drug addicts in this study suffered from limited access to food, poor dietary intakes and widespread malnutrition, and the women were probably most vulnerable. Heavy drug abuse and the high frequency of infections probably affected both nutritional intakes and needs, and most likely magnified the respondents' poor nutritional status.

Limited access to food may relate to heavy involvement in drug abuse and drug dealing, unstable housing, lower energy intake and underweight. On the other hand, those who reported receiving a disability pension, smoking hashish, having recently participated in a treatment or rehabilitation programs, receiving more food from providers, eating and cooking more frequently and having closer relations with family and friends, were more content with their access to food.

A high intake of added sugar, more pronounced among those who reported abscess infections and regular use of heroin, has an impact on the intake of essential nutrients. Easy-to-chew food items with a high content of added sugar made a major contribution to the dietary intake. Further, food choices were monotonous, and the addicts' average intakes of vegetables, fruit and fish were very low.

The number of daily eating events was generally low and varied considerably, and only 29 percent of the total sample reported a homeostatic energy intake on the day of investigation. Few respondents reached the recommended intakes (RI) of essential nutrients, due to the poor nutritional quality of their diets, which was below the nutrient density of the average Norwegian diet.

Anthropometric and biochemical measurements frequently deviated from the reference values for the clinically healthy Norwegian population, indicating that the illicit drug addicts in this study suffered from poor health due to severe malnutrition and metabolic disturbances.

**Implications**

It is now accepted that drug addiction is a disease due to the physical changes that occur in areas of the brain critical to judgment, decision-making, behavior control and learning and memory. This must be kept in mind when intervening for improved dietary habits and nutritional status among illicit drug addicts. If the intention is to raise the nutritional status to similar levels as that of the general Norwegian population, dietary interventions must be tailored to fit the particular needs of the drug addicts. Additional to drug related treatment and rehabilitation, improved cooking skills and eating habits, preferably together with family and friends, should be facilitated and encouraged. This could in addition to improve the nutritional status also serve as a natural induced source of feeling of reward. Stable housing and safe and sufficiently sources of income must be made accessible, as may sensory and nutritional acceptable diets, all to promote a better health among the illicit drug addicts.

**Further investigations**

The high prevalence of mental illness and severe infections are a real threat to the illicit drug addicts' health. Depressions and infections in drug addicts may be linked to food insecurity, and probably reinforced by malnutrition and a lack of healthy food (15).

Depressive symptoms have been associated with a low intake of sea-food and fish (98, 99), and generally with serum-levels of vitamin $D_3$ below 40 nmol/l (100). Low intake of folic acid, especially among males smoking tobacco, may increase susceptibility to depression, as tobacco smokers have a higher folic acid requirement (101). Folic acid supplementation has been found to improve the effect of anti-depressive medication in patients with high levels of homocysteine (102).

Protein-energy malnutrition and deficits of individual nutrients are associated with significant impairment of the immune system. Even relatively mild deficits of zinc, selenium, iron, vitamins A, C, E and $B_6$ and/or folic acid have clearly negative influence on immune responses (22). The effect of supplementation with selected essential nutrients to improve recovery from infections should be investigated.

Future investigations should explore whether dietary interventions focusing on optimization of food accessibility, food enjoyment and intake of energy and essential nutrients could reduce harm among those who wish to continue using drugs, or how such measures can help those who want to stop the abusing of drugs.

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# Living as a drug addict in Oslo, Norway – a study focusing on nutrition and health

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## Abstract

*Objectives:* To investigate nutritional status and related living conditions among drug addicts in Oslo.

*Design:* A cross-sectional study of nutritional status evaluated by anthropometric and biochemical measurements; a structured interview concerning education, living conditions, income source, drug history and sex practice; and biochemical testing of sexually transmitted infections.

*Setting:* The present study was conducted between November 2001 and April 2003 in locations where the drug addicts reside in Oslo.

*Subjects:* A total of 123 male and seventy-two female addicts using drugs by injections regularly.

*Results:* We found that 20 % of the women were moderately underweight (BMI in kg/m$^2$) (16·5 < BMI < 18·5), 7 % were severely underweight (BMI ≤ 16·5) and 3 % of the men were moderately underweight (16·5 < BMI < 18·5). BMI was positively correlated with days institutionalised and number of eating events per day. Respondents sleeping rough had significantly reduced BMI compared to those in hostels and shelters. The concentrations of Hb, serum ferritin and albumin supported a higher prevalence of malnutrition among the women. Hepatitis C was found in 85 %, active hepatitis B in 6 % and less than 2 % were HIV positive. Also, 84 % received public financial support, 38 % of the women had prostitution as a significant income source, while burglary was most prevalent among the men; 20 % were pushing drugs.

*Conclusion:* Malnutrition among the drug addicts varied from 5 % to 30 %, independent of drug history, education and income. Moderate and severe underweight was most prevalent among the women. Being previously institutionalised and having increased number of eating events increased BMI. Sleeping rough correlated with reduced body weight. Hepatitis C infection was common; hepatitis B and HIV were rare.

**Keywords**
Drug addicts
Nutritional status
Living conditions
Number of eating events
Sexually transmitted infections

Drug addicts, defined as persons abusing drugs by injections[1], live in the periphery of our affluent society, into which they have only limited access. They constantly stay in a stressful situation trying to escape from abstinence, creditors and the police as it is prohibited by the judicial system to use, store, buy and sell such drugs outside public regulation in Norway[2]. Temporarily they migrate to the larger cities to be able to get hold of more and cheaper drugs. It has been reported that 90 % of drug addicts develop a substance-independent mental disorder, mainly symptoms of anxiety[3], which may explain the high prevalence of suicides and overdoses in this population[4].

Searches in ISI Web of Knowledge and Medline databases gave few results on food and nutrition-related living conditions among drug addicts not participating in any treatment or rehabilitation programme. This may be due to lack of interest for this topic in general in the scientific community, in addition to difficulties in carrying out such studies. There have, however, been studies focusing on childhood conditions in the development of drug abuse[5]. The effects of treatment and detoxification programmes have also been studied[6–9].

Both BMI and albumin are among the parameters used in assessing nutritional status, and drug addicts

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undergoing detoxification have shown statistically significant lower BMI and albumin concentrations compared with control groups not using such drugs[10].

Sexually transmitted infections (STI) such as hepatitis B and HIV/AIDS have been associated with illicit drug abuse and negative health effects, including underweight and anaemia[11,12].

The objectives of the present study were to investigate nutritional status and living conditions of drug addicts, including education, source of income, housing and number of meals, in addition to drug history and STI. The addicts were not participating in any drug-related treatment programme when they underwent this assessment.

## Materials and methods

### *Study design*

This is a cross-sectional study of drug addicts who were called upon at locations such as hospices, shelters, meeting places for drug addicts or directly on the streets. The recruitment and examination took place at twenty-three different locations, both at night and at daytime, in the period from November 2001 to April 2003. Immediately after consent, each of the 220 respondents was interviewed before anthropometrical measurements were taken and blood samples were drawn. Difficulties with blood sampling from twenty-five participants resulted in a final number of 195 adult respondents. The participants received snacks such as yoghurt, muffins, chocolate milk and cigarettes after the interviews and testing were completed.

This study was performed according to the Helsinki Declaration[13], and approved by the Norwegian Regional Committee for Medical Ethics. Permission to store personal data on files was obtained from the Norwegian Social Science Data Service. Each participant gave his or her written consent.

### *Subjects*

The 195 respondents were recruited from a population of drug addicts in Oslo, estimated by The Norwegian Institute for Alcohol and Drug Research in 2002 to be between 2750 and 3850 persons, of which 25–30 % were women. Thirty-seven per cent of the subjects in the present study were women. About 16 % of the respondents had their official residency outside Oslo.

All the respondents were adults, that is, older than 18 years of age. Mean age was 36·2 (SD 7·0) years for the 123 men and 34·5 (SD 7·4) years for the 72 women. All reported tobacco smoking.

### *Methods*

A pre-coded questionnaire was used to obtain information about living conditions including number of eating events (meals and snacks) and drug intake during the last 24 h. Four nutritionists carried out the interviews. One physician and three biomedical laboratory scientists took the anthropometric measurements and drew blood samples. Body height (m) and weight (kg) were measured by WHO's standardised methods[14], and were used for calculation of BMI (kg/m$^2$). Moderate underweight was defined as $16{\cdot}5 < \text{BMI} < 18{\cdot}5$ and severe underweight corresponded to $\text{BMI} \leq 16{\cdot}5$ for both genders[14]. Arm muscle circumference (AMC) was attained by procedures described by Symreng[15]. Low values for AMC in the age group 20–39 years were $\text{AMC} \leq 22$ cm for men and $\text{AMC} \leq 18$ cm for women[15]. Blood samples were obtained from all respondents according to standardised methods. Analyses for C-reactive protein (CRP), albumin, Hb, serum ferritin and antibodies against hepatitis B (HBsAg and Anti-HBc), C and HIV virus were carried out at Fürst Medical Laboratories in Oslo according to international accredited methods. Drug detection in blood was carried out at the Norwegian Institute of Public Health, Department of Forensic Toxicology and Drug Abuse.

### *Statistics*

For normally distributed data, parametric tests were performed, and for non-normally distributed data non-parametric tests were used. Student's *t*-test and Mann–Whitney *U*-test analysed differences between groups. Correlation coefficients were analysed by Pearson's test and Spearman's test. Multiple linear regression analyses were used to investigate the impact on BMI by the different living conditions. All multiple regression analyses were adjusted for gender and age in block by entering variable selection options, and they were also thoroughly checked for possible violations from the model assumptions during analyses. $P$ values $\leq 0{\cdot}05$ were considered significant. All statistical analyses were performed by SPSS version 13·00 (SPSS Inc., Chicago, IL, USA).

## Results

To test the validity of the respondents' information about drug abuse, blood samples were analysed with respect to the most used substances in the first twenty-five respondents. With regard to the type of drugs reported to be used in the last 24 h, 98 % were detected. This implies that all respondents were intoxicated (drugged) during the investigation.

The most frequently used drugs by the respondents were heroin and rohypnol, usually in combination with other substances including methadone (Table 1). Mean age for drug debut was 14·4 (SD 4·2) and 16·1 (SD 6·6) years for men and women, respectively, and number of years injecting drugs for the men was 14·9 (SD 9·0) and for the women 14·1 (SD 8·8).

Table 2 shows some socio-economic variables: educational level, sources of income and type of housing. Eight per cent of the men and 12 % of the women had not completed any education. The majority had completed

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**Table 1** Self-reported drug use during the last 24 h among 195 drug addicts in Oslo

| | Men (*n* 123) % | Women (*n* 72) % |
|---|---|---|
| Heroin | 72 | 78 |
| Amphetamine | 32 | 32 |
| Hashish/cannabis | 27 | 14 |
| Rohypnol | 52 | 63 |
| Benzodiazephines | 15 | 22 |
| Methadone + illegal drugs | 8 | 8 |

**Table 2** Educational level, sources of income and type of housing among drug addicts in Oslo (educational distribution for the general population in parentheses)

| | Men | | Women | |
|---|---|---|---|---|
| | *n* | % | *n* | % |
| Educational level | 117 | | 69 | |
| None completed | | 8 (8) | | 12 (9) |
| Primary and lower secondary school | | 64 (20) | | 61 (16) |
| Upper secondary school | | 21 (36) | | 22 (33) |
| College/university | | 7 (36) | | 6 (43) |
| Sources of income | 123 | | 72 | |
| Social security benefits | | 56 | | 57 |
| Disability pension | | 24 | | 24 |
| Rehabilitation benefits | | 7 | | 3 |
| Family/friends | | 8 | | 10 |
| Begging | | 8 | | 3 |
| Break-in/burglary | | 26 | | 11 |
| Prostitution | | 2 | | 38 |
| Pushing drugs | | 23 | | 18 |
| Type of housing last month | 123 | | 71 | |
| Own home | | 21 | | 24 |
| Hospice, lodging, night shelter | | 51 | | 51 |
| Rehabilitation/treatment ward | | 14 | | 22 |
| Acute ward | | 2 | | 4 |
| Friends and family | | 8 | | 21 |
| Sleeping rough | | 8 | | 10 |

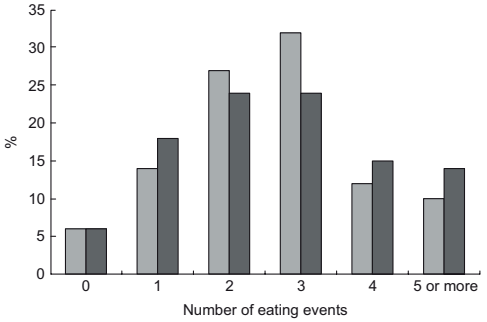


**Fig. 1** Number of eating events during the last 24 h among drug addicts in Oslo: percentage of women (■, *n* 72) and men (▫, *n* 123)

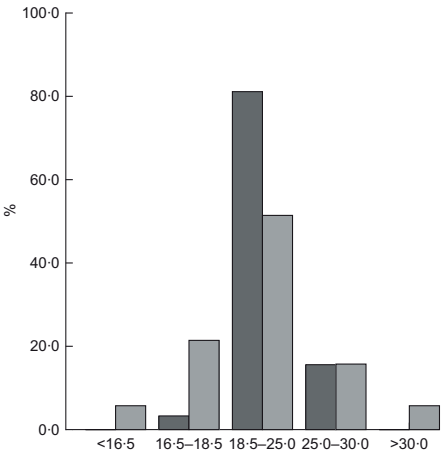


**Fig. 2** BMI (kg/m$^2$) among drug addicts in Oslo: percentage of women (▫, *n* 72) and men (■, *n* 123)

lower secondary school, but not upper secondary school or any higher education. The most frequent source of income was social security benefits, followed by disability pension, burglary for men and prostitution for women. Begging, pawning and returning robbed bankcards to the bank were reported as supplementary ways of getting money (not shown).

Forty-six per cent of the men and 41 % of the women respondents had been institutionalised at least 14 days during the last 12 months. Median days institutionalised was 54 for the men and 28 for the women. Approximately 80 % of these had received treatment against drug addiction, 50 % had been imprisoned, 41 % of men and 68 % of women had been hospitalised, whereas 10 % had been patients in psychiatric institutions.

The majority of the respondents were homeless, staying in hospices, lodgings and night shelters, and occasionally they slept rough, i.e. on the street, in parks and parking houses during the last month. More than 20 % of the respondents had a residence at their own disposal. While 8 % of the men reported use of more than one type of lodging the last month, the corresponding figure for the women was 19 % (Table 2). Approximately 40 % never prepared a hot meal, in spite of access to facilities for food storage (>85 %) and cooking (>80 %).

Men had on average 2·6 (SD 1·4) eating events per day, while women had 2·7 (SD 1·6). A meal here means eating and drinking any kind of food including snacks. However, there was a large variation in the meal pattern (Fig. 1). Six per cent had not eaten anything the last 24 h, and this was the same for both genders.

The distribution of BMI (kg/m$^2$) was quite different for women and men (Fig. 2). Seven per cent of the women were severely underweight (BMI ≤ 16·5), 20 % were moderately underweight (16·5 < BMI < 18·5) and only one woman had an AMC measure below 19 cm (low value). Of the men only 3 % were moderately underweight (16·5 < BMI < 18·5) and two men had an AMC measure below 23 cm (low value). On the other hand, 22 % of the

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women and 14% of the men were overweight/obese (BMI > 25).

BMI was positively correlated with age ($P < 0{\cdot}01$), and men had significantly higher BMI than women ($P < 0{\cdot}05$). When adjusted for age and sex, BMI was positively correlated with days institutionalised ($r = 0{\cdot}30$, $P < 0{\cdot}01$) and number of eating events per day ($r = 0{\cdot}26$, $P < 0{\cdot}01$). In the multivariate model, 16% of the variance was explained by these variables (Table 3). Those who slept rough during the previous month had a significantly lower BMI compared with those in hostels and own lodging ($P < 0{\cdot}01$). Drug abuse and drug history did not influence the drug addicts' body weight.

Twenty-five per cent of the male addicts and 63% of the females reported being sexually active with partners. Two per cent of the males and 38% of the females were prostitutes. Among the men 5% used condoms, whereas 33% of the women did. All had access to condoms for free. Six per cent of the male addicts had an acute or chronic hepatitis B infection, 2% were HIV positive. None of the females had hepatitis B or were HIV positive. All had access to injection material for free.

Hepatitis C infection was present in about 85%. Serum albumin concentration was lower for respondents infected with hepatitis C virus for both genders ($P < 0{\cdot}01$). Respondents with methadone abuse had a lower albumin concentration compared with the rest of the respondents ($P < 0{\cdot}05$) (data not shown).

Fifty per cent of the women had CRP values higher than the reference (>10 mg/l), as did 43% of the men. After excluding those with CRP values above the reference value, the values for Hb, serum ferritin and albumin are shown in Table 4. Twelve per cent of the men and 26% of the women had Hb concentrations below the normal range (reference 12·5–16·5 g/100 ml for males and 11·5–15·5 g/100 ml for females). Serum ferritin concentration below the reference value (20–300 μg/l for males and 15–200 μg/l for females) was found in 5% of the men and 19% of the women. Twelve per cent of the men and 30% of the women had albumin values below normal (40–51 g/l).

**Table 3** BMI as a function of age, gender, number of days in institution and number of eating events in 187 drug addicts living in Oslo ($r^2 = 0{\cdot}16$, $P < 0{\cdot}001$)

| Explanatory variables | $\beta$ | 95% CI | $P$ |
|---|---|---|---|
| Age (years) | 0·086 | 0·03, 0·142 | 0·003 |
| Sex | −0·962 | −1·85, −0·07 | 0·034 |
| Number of days in institution | 0·009 | 0·005, 0·014 | <0·001 |
| Number of eating events | 0·388 | 0·09, 0·69 | 0·012 |

Beta values are unstandardised coefficients.

## Discussion

The present study has posed many different challenges. We experienced difficulties at different administrative levels in the public aid system. We also learned that making appointments with the drug addicts in advance was useless. Therefore, the examination of the respondents had to take place immediately after inclusion. Hence, it was not possible to obtain a representative sample from the population of the drug addicts, and the selection was both opportunistic and strategic. This has to be kept in mind when interpreting the results.

An important issue in this study concerns the reliability of the responses to the questionnaire, since the respondents were under the influence of drugs. We had the

**Table 4** Anthropometric measurements and selected blood parameters in drug addicts in Oslo

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | *n* | Mean or median | SD or min–max | *n* | Mean or median | SD or min–max |
| Height (cm) | 122 | 179 | 6·4 | 70 | 167 | 6·5 |
| Weight (kg) | 122 | 71·8 | 10·4 | 70 | 60·5 | 13·1 |
| BMI (kg/m$^2$) | 122 | 22·4 | 2·7 | 70 | 21·7 | 4·4 |
| AMC (cm) | 84 | 27·3 | 2·6 | 46 | 24·7 | 13·9 |
| CRP (mg/l) | 110 | | | 60 | | |
| Mean (SD) | | 16 | 20 | | 24 | 39 |
| Median (min–max) | | 9 | 2–166 | | 11 | 2–217 |
| CRP > 9 mg/l (%) | | 43 | | | 50 | |
| Hb (g/100 ml) | 57 | | | 27 | | |
| Mean (SD) | | 13·6 | 1·2 | | 12·1 | 1·6 |
| Median (min–max) | | 13·5 | 10·3–17·6 | | 12·2 | 7·9–14·9 |
| Hb < normal (%) | | 12 | | | 26 | |
| SF (μg/l) | 57 | | | 27 | | |
| Mean (SD) | | 72·1 | 49·0 | | 34.0 | 22·0 |
| Median (min–max) | | 52 | 13–281 | | 26 | 9–89 |
| SF < normal (%) | | 5 | | | 19 | |
| Albumin (g/l) | 57 | | | 27 | | |
| Mean (SD) | | 43·0 | 5·1 | | 41 | 3·0 |
| Median (min–max) | | 44 | 14–49 | | 41 | 35–47 |
| Albumin < normal (%) | | 12 | | | 30 | |

AMC, arm-muscle circumference; CRP, C-reactive protein; SF, serum ferritin.

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opportunity to check their ability to remember what kinds of substances they had used the last 24 h, since we also conducted blood analyses of the drugs. There was a match of 98% between their responses and the blood analyses. Thus, there is no reason to doubt the reliability of this information. Drug abuse reported earlier among Norwegian addicts, where 20% were younger than 18 years of age, corresponded with our results concerning the use of heroin and benzodiazephines[16]. However, the use of cannabis and amphetamine was more prevalent among those younger than 18 years of age. The drug intake among our respondents was much like the abuse pattern for the rest of the addict population older than 18 years[16].

The type of drugs used did not seem to have an influence on the drug addicts' body weight in the present study. Other studies have revealed an association between low BMI and 'speed' (cocaine and amphetamine), either alone or mixed with narcotics (opiates, for instance heroin), but not for opiates alone[17]. Our respondents mostly mixed different kinds of drugs, which probably masked the weight-changing effects. On the other hand, it is likely that the drugs affected Hb concentrations, of which 12–26% were under the reference value. Other studies have revealed such a connection[18], showing that use of heroin in itself is associated with lowered iron status. In the present study we found no impact of drug history (age of drug debut and number of years of drug abuse) on the nutritional status. The respondents' nutritional status measured by BMI improved with age, probably due to experience in how to survive as a drug addict.

BMI was on average lower among our respondents than in the general population[19]. Thirty per cent of the male addicts and 39% of the women had a BMI below 80% of the mean values for the general population of the same age group[19]. A study from Spain indicated that approximately 30% of drug addicts under treatment or detoxification weighed less than 80% of the mean weight for the general population[20]. Thus it is likely to be presumed that drug addiction in itself implies weight loss.

Underweight was nine times more frequent among our female respondents than the males. These gender differences could be due to bias in the recruitment, since this study could not be randomised. However, it is likely that the higher percentage of underweight among the women is due to the fact that more men had been institutionalised for longer periods (median days 54 for men and 28 for women). Being institutionalised during the last 12 months, including being in prison, had a significant positive influence on BMI. Another study, which focused on weight changes during recovery from drug abuse, verifies similar weight gain[21]. Without these institutional brakes, the drug addicts would probably have been even more undernourished.

The blood analysis of nutrient parameters supported the findings from the anthropometric measurements concerning a higher prevalence of malnutrition among female than male drug addicts. This coherence strengthens the validity of the data. Concentrations below reference values were twice as frequent among the females concerning Hb, four times regarding serum ferritin and more than double for albumin.

Korolenko *et al.*[22] found reduced albumin concentrations in all groups of drug addicts with drug addictive disorders (caused by crude home-made opiates) as a result of modified acute-phase reactions. We found increased CRP values among 43% of the male addicts and 50% of the women. Wilczek *et al.*[18] found a frequency of increased CRP values among 25% of opiate abusers. The elevated CRP concentrations in our study may be caused by hepatitis, crude opiates and other factors associated with lack of sufficient hygiene of injections.

Even though most of the respondents had access to facilities for food storage and cooking, many of them (40%) never prepared hot meals. On average, they had half the number of eating events (meals and snacks) a day (2·7 for women and 2·6 for men) compared with the results from a nationwide study (corresponding to 5·5 and 5·4 meals)[23]. Only 10% of the drug addicts had five or more eating events a day. The low number of eating events was important for their nutritional status, as shown in the multivariate analysis. Sleeping rough contributed to a deteriorated nutritional status and may be both a reason for and a consequence of sickness and exhaustion, due to lack of food and other basic needs, such as warming clothes and a proper place to sleep. Freezing and lack of sleep may contribute to drop in body weight. This assumption is supported by studies of homeless alcohol addicts in Paris[24]. No other connections between housing and nutritional status were seen, probably due to the generally poor housing.

Educational level was remarkably lower among the drug addicts than in the general population[25]. Completion rates at primary and secondary levels were almost the same for both genders. Concerning graduation from college or university, the gap between the general population and drug addicts was larger for the women (6% compared with 43%), even though there was a considerable gap also for the men (7% compared with 36%). No influence between educational level and nutritional status was seen, probably due to a small variation in educational level in the sample of this study.

Source of income was predominantly public financial support, which amounts to about 20% of an average Norwegian income[26]. There was no difference between the genders, in contrast to the general population, where women more often received such financial support[26]. Most of the addicts had several additional sources of income. We found no correlation between receiving public financial support and nutritional status in the present study, which indicates that the respondents obtained significant amounts of money from other sources, and/or got hold of food in other ways than purchasing with money.

Even though the present study has pointed out substantial malnutrition and other health-related hazards, these states may have been underestimated due to methodological and practical difficulties during sampling and data collection. However, the findings may reflect that the drug addicts who participated were still up and about, and not subject to any treatment. This may imply that their reduced nutritional status and failing health not yet had touched rock bottom.

## Conclusion

The drug addicts in the present study lived stressful lives, and were afflicted with health hazards such as malnutrition and chronic infections. This exposure was independent of drug history, education and income. Hepatitis C infection was common; hepatitis B and HIV were rare. Being previously institutionalised and having increased number of eating events increased BMI. Generally the housing was poor, and sleeping rough influenced nutritional status negatively.

The lives of the drug addicts probably resemble a roller coaster, switching from hectic periods of drug abuse at street level to calmer phases of treatment, rehabilitation and imprisonment, implying regular meals. This may cause rapid variations in nutritional status. In our study we met the addicts outside institutions, on varying levels on their way down the big dipper. Further studies that intend to investigate what drug addicts' changing nutritional status really implies should take into account this switchback effect, as a challenge towards a more precise estimation of the nutritional status among drug addicts.

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*Author contributions:* M.S. is the researcher and has carried out all parts of the project. M.H. has contributed to the writing of the manuscript and performed all statistical calculations. F.-L.E. has been responsible for the medical examinations and the design of the protocol. A.S. has participated in the design of the protocol and in the field work. M.W. has participated in the writing of the manuscript. T.B. has participated in the design of the protocol and writing of the manuscript. A.O. is the principal investigator and has taken part in the design and writing of the manuscript.

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# High sugar consumption and poor nutrient intake among drug addicts in Oslo, Norway

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Poor dietary habits among drug addicts represent health hazards. However, very few studies have focused on dietary intake as an independent health risk factor in relation to this group. The objective of the present study was to examine the dietary habits of drug addicts living on the fringes of an affluent society. The study focused on food access, food preferences, intake of energy and nutrients, and related nutrient blood concentrations. The respondent group consisted of 123 male and seventy-two female drug addicts, who participated in a cross-sectional study that included a 24 h dietary recall, blood samples, anthropometrical measurements and a semi-structured interview concerning food access and preferences. Daily energy intake varied from 0 to 37 MJ. Food received from charitable sources and friends/family had a higher nutrient density than food bought by the respondents. Added sugar accounted for 30 % of the energy intake, which was mirrored in biomarkers. Sugar and sugar-sweetened food items were preferred by 61 % of the respondents. Of the respondents, 32 % had a TAG concentration above the reference values, while 35 % had a cholesterol concentration beneath the reference values. An elevated serum Cu concentration indicated inflammation among the respondents. Further research on problems related to the diets of drug addicts should focus on dietary habits and aim to uncover connections that may reinforce inebriation and addiction.

**Nutritional status: Drug addicts: Illegal drugs: Nutrient intake: Food intake: Diet**

There is a general opinion that drug addicts' poor health is primarily caused by the use of illegal drugs. Inadequate food and nutrient intake have not attracted the same scientific attention, although dietary habits are generally accepted as important predictors of the health and nutritional status of a population[1].

It has previously been pointed out that addicts' lives are unstable, alternating between periods of hectic drug abuse and calmer rehabilitation[2]. Most studies dealing with food habits and nutritional status in relation to addiction have focused primarily on alcoholics[3]. Drug addicts have not received the same scientific attention, although nutritional status has been assessed, for example, during detoxification and rehabilitation. Such studies have revealed poor protein and vitamin status[4–7]. Malnutrition has also been described during autopsies of drug addicts[8]. However, these cases represent end-stage situations, and probably do not reflect the circumstances of the living population of drug addicts.

Drug addicts' acquired preference for sweet food items has attracted scientific attention, as have the neural similarities between the responses to eating and abusing drugs[9,10]. Searches of the ISI Web of Knowledge and the Cochrane and Medline databases produced few results relating to dietary intake and related health conditions among drug addicts who do not participate in any treatment or rehabilitation programme. The present investigation recruited participating addicts on the streets, at night shelters and at meeting places. An underlying assumption is that drug addicts' personal preferences and food choices are most genuinely expressed in their day-to-day actions.

The objectives of the present study were to investigate access to food, dietary intake during the previous 24 h, and to assess nutritional status among the drug addicts by blood analyses of TAG, lipoproteins and selected nutrients in relation to reference values.

## Materials and methods

### *Study design*

The study was a cross-sectional comprehensive study that included interviews using a pre-coded questionnaire, one 24 h dietary recall, clinical examination, anthropometrical measurements and blood sampling. The interviews were

**Abbreviations:** E%, energy percentage; HbA1c, glycosylated Hb; PALei, physical activity level; RI, recommended intake.

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carried out in the period from November 2001 to April 2003. After completion of the medical examination and interviews and collection of blood samples, the participants were offered a snack consisting of yoghurt, muffins and chocolate milk, as well as cigarettes.

The study was carried out in accordance with the Helsinki Declaration (WMA 2002), and was approved by the Norwegian Regional Committee for Medical Ethics. Permission to store personal data on files was obtained from the Norwegian Social Science Data Service. Each participant gave his/her written consent.

### *Subjects*

Drug addicts were contacted at hospices, lodgings, night shelters, meeting places and directly on the streets in Oslo (the capital of Norway). Recruitment and examination took place at twenty-three different locations, both at night and in daytime. A total of 220 respondents were recruited. The interview, anthropometrical measurement, medical examination and blood sampling were carried out immediately after a participant agreed to participate. The number of participants was reduced to 195 adult respondents (123 males and seventy-two females) because of difficulties experienced in collecting blood samples due to damaged veins (caused by regular injections and long-term insufficient hygiene). These dropouts may have influenced the results, but all the participants were intoxicated and heavy users of illegal drugs. Of the participants, 16 % reported living outside Oslo. Women accounted for 37 % of the total sample. The addicts were not participating in any drug-related treatment programme at the time of this assessment.

The respondents were all above 18 years of age. The mean age of the 123 males was 36·2 (SD 7·0) years. For the seventy-two females, it was 34·5 (SD 7·4) years. Initial drug use had started at the mean ages of 14·4 (SD 4·2) years (males) and 16·1 (SD 6·6) years (females). The males had used injections for a mean period of 14·9 (SD 9·0) years, and the females for 14·1 (SD 8·8) years. All of the subjects reported smoking tobacco.

### *Methods*

Four nutritionists conducted the interview using a pre-coded questionnaire to obtain information about living conditions and the preference for sweet food items. A dietary recall, where the respondents were asked what they had eaten during the previous 24 h, was carried out. The respondents were further asked if the food was obtained from private or public contributors, or bought independently. The timing of food intake (data not included in the results) and use of food supplements were also registered. Models of glasses, cups and plates of different sizes were used to quantify the portion sizes, in addition to pictures of the dishes most commonly served at places where drug addicts are offered food. Nutrient intake was calculated using the Norwegian Food Composition Table[11] and FoodCalc software[12]. Added sugar was calculated as sucrose present in jam, soft drinks, cakes, ice cream, and chocolate as well as sugar added to coffee and tea or sprinkled on cereals. To ensure homogeneity in the data collection, inter-correlation analyses were performed on the interviewers.

### *Validation*

To test the validity of respondents' information, the blood samples were analysed with respect to illegal drugs in the first twenty-five respondents. Of the illegal drugs reported by the respondents, 98 % were detected in the blood analyses. This indicated that the respondents were able to give valid information.

Eighty-three percent of the men and 47 % of the women had a BMI ($kg/m^2$) within the normal BMI range ($18{\cdot}5 < BMI \leq 25\,kg/m^2$), 10 % of the women and 3 % of the men had a BMI beneath the normal range and 22 % of the females and 14 % of the males had a BMI above the normal range[2]. Physical activity level (PALei) (energy intake/RMR) was calculated to estimate energy intake in relation to calculated energy requirement, and used to illustrate the range in energy intake among the respondents. RMR was calculated using the WHO expert group standard equation[13], using measured weight and height at the time of examination. Calculated PALei values were divided into four categories corresponding to; no food intake PALei = 0, bed rest PALei $\leq$ 1·2, homoeostatic eating 1·2 $<$ PALei $<$ 2·2 and a positive energy balance PALei $\geq$ 2·2[14].

### *Laboratory analyses*

One physician and three biomedical laboratory scientists collected blood from the drug addicts by venepuncture. TAG, total cholesterol and HDL-cholesterol were determined by enzymatic methods on a Modular P analyzer (Roche, Castle Hill, NSW, Australia).

LDL-cholesterol was calculated using the Friedewald equation. HbA1c was analysed by means of an immunoturbidimetric assay on a Hitachi 917 analyzer (Roche). Se, Zn and Cu in serum were measured by means of graphite furnace atomic absorption spectrometry, on a Solaar M6 instrument from Thermo Elemental. These analyses were performed at Fürst Medical Laboratory (Oslo, Norway), and accredited/certified in accordance with NS-EN ISO/IEC 17 025.

C-peptide levels were determined on an Immulite 2000 (Diagnostic Products Corporation, Los Angeles, CA, USA) by Oslo University Hospital, Aker Hormone laboratory. Vitamins A, D and E were all analysed from serum samples in the same assay to avoid inter-assay variations. Analyses of fat-soluble vitamins were carried out by AS Vitas (Oslo, Norway; www.vitas.no), performed using an HP 1100 liquid chromatograph (Agilent Technologies, Palo Alta, CA, USA). Thiamine diphosphate (vitamin $B_1$)[15] in blood was determined by HPLC, and ascorbic acid (vitamin C) in serum with a photometric assay method was used for the assay[16] at Oslo University Hospital, Aker Nutritional Laboratory.

### *Statistics*

Food group intake is presented as means and standard deviations including only those who had an intake of that food group at the day of investigation. Nutrient intake was

evaluated by reference to the Nordic Nutrition Recommendation and the recommended intake (RI)[17]. Parametric tests were performed for normally distributed data, while non-parametric tests were used for non-normally distributed data. Student's *t* tests and Mann–Whitney *U* tests analysed the differences between groups. Correlation coefficients were analysed using Pearson's test and Spearman's tests. $P$ values$\leq$0·05 were considered significant. All the statistical analyses were performed using SPSS, version 14.00 (SPSS, Inc., Chicago, IL, USA).

## Results

Limited access to food was reported by 64 % of the drug addicts, mainly due to a lack of money. In response to the question of how they obtained food, 68 % stated that they bought most of the food themselves, while 32 % named family/friends and public/private charitable organisations as the providers of most of the food. Eleven percent also admitted theft from grocery stores, and 4 % had collected food from garbage bins. A special preference for sweet food items was reported by 61 % of the respondents.

Most meals eaten during the previous 24 h consisted of sandwiches and snacks, which accounted for 60 % of energy intake. Males had dinner more frequently than females, while females had more snack meals.

Except for sugar-sweetened soft drinks and bread/cereals, no food group was consumed by more than 50 % of the respondents (Table 1). Less than 30 % of the respondents had consumed vegetables, fruit or fish during the previous 24 h. In general, there was little variation in the addicts' food choices, with a common preference for food items containing added sugar which were easy to chew.

Five percent of the male addicts and 6 % of the females reported no food intake in the last 24 h corresponding to PALei = 0 (Fig. 1). Forty-seven percent of the males and 62 % of the females fell into the category PALei $\leq$ 1·2. The category 1·2 < PALei < 2·2 covered 38 % of the male addicts and 20 % of the females, while 10 % of the males and 12 % of the females fell into the category PALei $\geq$ 2·2. The respondents who reported limited access to food had a lower PALei than those who reported being satisfied ($P$=0·050 for women and $P$=0·052 for men). There was no correlation between BMI and PALei.

**Table 1.** Number of respondents reporting intake of food items from the different food groups during the previous 24 h

(Mean values and standard deviations, *n* 184)

| Food groups | *n* | % | Mean (g) | SD |
|---|---|---|---|---|
| Sugar-sweetened soft drinks | 119 | 65 | 793 | 662 |
| Bread/cereals | 115 | 63 | 187 | 167 |
| Milk | 90 | 49 | 500 | 500 |
| Meat and meat products | 84 | 46 | 220 | 218 |
| Butter/margarine | 77 | 42 | 35 | 44 |
| Ice cream and milk desserts | 62 | 34 | 263 | 222 |
| Cookies | 56 | 30 | 153 | 107 |
| Sweets | 55 | 30 | 95 | 84 |
| Coffee | 48 | 26 | 430 | 329 |
| Vegetables | 43 | 23 | 133 | 124 |
| Fruit | 37 | 20 | 315 | 365 |
| Sweet spreads | 36 | 20 | 56 | 58 |
| Cheese | 35 | 19 | 46 | 37 |
| Yoghurt | 30 | 16 | 241 | 123 |
| Fish and fish products | 27 | 15 | 93 | 72 |
| Potatoes | 22 | 12 | 187 | 118 |
| Juice | 22 | 12 | 574 | 437 |
| Eggs | 15 | 8 | 104 | 64 |
| Snacks | 5 | 3 | 164 | 128 |
| Artificially sweetened soft drinks | 5 | 3 | 590 | 230 |

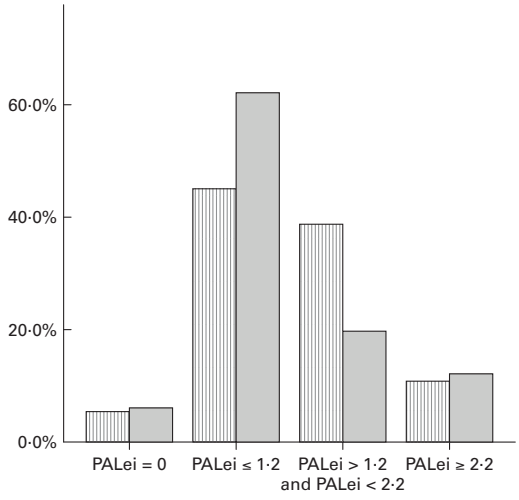


**Fig. 1.** Proportion of drug addicts by physical activity level (PALei) categories ($n_{Male}$ 123, $n_{Female}$ 72). EI, energy intake. PALei = 0 (corresponding to no food intake in the previous 24 h), PALei ≤ 1·2 (corresponding to bed rest), 1·2 < PALei < 2·2 (corresponding to homoeostatic eating) and PALe ≥ 2·2 (corresponding to consumption of more energy than expended during the previous 24 h). ▨, Male; □, female.

Mean for energy intake for the male drug addicts was 9·2 (SD 5·6) MJ, while the females' intake corresponded to 6·8 (SD 5·3) MJ among those who reported food intake in the last 24 h. Minimum and maximum energy intake on the day of investigation varied from 0 to 37·0 MJ for men and from 0 to 29·4 MJ for women. The energy percentage (E%) distribution between the macronutrients and alcohol is shown in Table 2. Protein contributed with 11 E% in total, with 3 E% from milk and milk desserts in both sexes. For the male addicts, meat and meat products contributed with 3 E%, and 1·3 E% for the females, while protein from cereals gave 2 and 1 E% for men and women, respectively. Protein from sweet cakes and sweet yeast rolls added 1 E% to the females' diet. No correlation was found between protein intake and serum albumin concentrations. Alcohol intake was 9·9 (SD 37·1) and 2·6 (SD 12·3) g for men and women, respectively, corresponding to 2 (SD 12) E% of the total energy intake (Table 2).

Fat accounted for 27 (SD 13) E% and polyunsaturated fat accounted for 4 (SD 7) E% for the whole sample. Total carbohydrates accounted for 60 (SD 17) E% and added sugar provided 30 (23) E% (Table 2) with a maximum amount of 850 g. The fibre content of the diet was 1·3 (SD 0·9) g/MJ.

The intakes of vitamins and minerals were below the RI, and only 20 % of the respondents reached the RI levels for

**Table 2.** Energy percentage distribution from macronutrients and alcohol among drug addicts during the previous 24 h

(Mean values and standard deviations, *n* 184 (men and women together))

| | Energy percentage (%) | |
|---|---|---|
| Nutrients | Mean | SD |
| Protein | 11 | 5 |
| Fat | 27 | 13 |
| Saturated fat | 12 | 7 |
| Monounsaturated fat | 8 | 4 |
| Polyunsaturated fat | 4 | 4 |
| Carbohydrates | 60 | 17 |
| Added sugar | 30 | 23 |
| Alcohol | 2 | 12 |

thiamin, ascorbic acid, Mg and Fe; correspondingly 30 % for riboflavin, niacin, Ca, Zn and Cu. Hardly any respondent reached the RI for vitamin D (Table 3). Only three respondents reported intake of a dietary supplement during the previous 24 h (data not included in the results). Food from charitable sources and friends was more nutrient dense and had a higher concentration of vitamin D, Se, Fe, vitamin A, thiamin, niacin, ascorbic acid and Zn than food bought by the respondents ($P<0{\cdot}05$). Drug addicts who reported limited access to food had lower intakes of thiamin, niacin and Mg ($P=0{\cdot}051$) than those who were content with their food intake. In addition, the males who reported not having enough to eat also had lower intakes of the vitamins A, D and E, riboflavin, K and Se ($P=0{\cdot}05$ for all).

There were no significant differences between the sexes in relation to blood parameter concentrations, apart from glycosylated Hb (HbA1c), vitamin A, Se and Cu (Table 4). The mean concentrations of TAG, HbA1c and C-peptides fell into the normal range. More than 20 % of the respondents had TAG concentrations above the upper reference values, with maximum values of 3·43 and 3·16 mmol/l for males and females, respectively. For the participants, 35 % had total cholesterol concentrations below reference values; correspondingly, 12 % HDL and 17 % LDL concentrations were below the lower reference value; no concentration was above the upper reference value. The concentrations of HbA1c were above the reference value for 12 % of the males and 20 % of the females. For C-peptide concentrations, 32 % of the male and 34 % of the female respondents exceeded the upper reference value. The maximum concentrations of HbA1c were 11·7 and 12·0 % for males and females, respectively, and for C-peptide, the maximum concentrations were 5·275 and 2·475 pmol/l, respectively. Of the respondents, 70 % did not reach the lower reference value for 25-hydroxy-vitamin $D_3$. For vitamin A, none had a concentration beneath the reference value. The females had a sub-reference value of vitamin E concentration three times more often than the males. Se concentrations were within reference values for 91 % of the male and 84 % of the female addicts; none of the respondents had a concentration above the reference values. Zn concentrations were within reference values for 88 %, and 7 % were below. Concerning Cu, 35 % of the men and 32 % of the women had concentrations above reference values, and none had subnormal values.

The vitamin C blood concentrations of 50 % of the respondents fell below the reference value, while 10 % of the Se concentrations fell below the reference values. The males who reported limited access to food had lower blood concentrations of TAG ($P=0{\cdot}01$), vitamin A and total cholesterol (all $P<0{\cdot}05$), which was not the case for the females.

## Discussion

More than half of the addicts reported limited access to food, explained by shortage of money. Energy intake varied considerably between the respondents, and the food choices

**Table 3.** Nutrient intake among drug addicts in Oslo and the percentage below the recommended dietary intake according to the Nordic Nutrition Recommendations (NNR)†

(Median values and 5th (P5)–95th percentiles (P95))

| | Male (*n* 116) | | | Female (*n* 68) | | |
|---|---|---|---|---|---|---|
| | Median | P5–P95 | Percentage below NNR† (reference value) | Median | P5–P95 | Percentage below NNR† (reference value) |
| Vitamin A (μg) | 402* | 0–1580 | 93 (900 μg) | 218 | 0–1315 | 82 (700 μg) |
| Thiamin (mg) | 0·8** | 0–2·7 | 72 (1·4 mg) | 0·5 | 0–2·5 | 83 (1·1 mg) |
| Riboflavin (mg) | 1·2* | 0–5·1 | 61 (1·7 mg) | 0·8 | 0–6·1 | 64 (1·3 mg) |
| Niacin equivalents (mg) | 17·6** | 0–50·0 | 57 (19 mg) | 8·4 | 0–44·8 | 71 (15 mg) |
| Ascorbic acid (mg) | 12 | 0–229 | 77 (75 mg) | 10 | 0–305 | 76 (75 mg) |
| Vitamin D (μg) | 0·7 | 0–5·7 | 98 (7·5 μg) | 0·4 | 0–4·8 | 100 (7·5 μg) |
| Vitamin E (mg) | 4 | 0–14 | 83 (10 mg) | 3 | 0–17 | 85 (8 mg) |
| Ca (mg) | 500 | 0–1950 | 62 (800 mg) | 445 | 0–1790 | 78 (800 mg) |
| Mg (mg) | 230** | 0–655 | 74 (350 mg) | 150 | 0–570 | 79 (280 mg) |
| K (g) | 2·3* | 0–5·4 | 82 (3·5 g) | 1·6 | 0–5·2 | 88 (3·1 g) |
| Se (μg) | 20* | 0–73 | 85 (50 μg) | 10 | 0–75 | 90 (40 μg) |
| Fe (mg) | 5·8** | 0–22·0 | 74 (9 mg) | 3·4 | 0–17·0 | 90 (15 mg) |
| Zn (mg) | 6·5** | 0–18·5 | 64 (9 mg) | 3·4 | 0–20·9 | 75 (7 mg) |
| Cu (mg) | 0·8** | 0–2·7 | 55 (0·9 mg) | 0·5 | 0–2·0 | 75 (0·9 mg) |

Difference between sexes: *$P<0{\cdot}05$ and **$P<0{\cdot}01$.
† Equal to recommended dietary intake.

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**Table 4.** Lipids and selected nutrient concentrations in blood of drug addicts with reference values
(Mean values and standard deviations)

| | Male | | | | Female | | | |
|---|---|---|---|---|---|---|---|---|
| | *n* | Mean | SD | Reference values | *n* | Mean | SD | Reference values |
| TAG (mmol/l) | 113 | 1·37 | 0·67 | <1·7 | 66 | 1·37 | 0·61 | <1·8 |
| Total cholesterol (mmol/l) | 113 | 4·85 | 0·90 | 3·6–7·0 | 66 | 4·14 | 0·88 | 3·9–8·0 |
| HDL (mmol/l) | 112 | 1·14 | 0·33 | 0·8–2·0 | 63 | 1·24 | 0·44 | 0·8–2·0 |
| LDL (mmol/l) | 106 | 2·29 | 0·81 | 1·6–5·7 | 58 | 2·23 | 0·70 | 1·6–5·7 |
| HbA1c (%) | 111 | 5·8 | 0·7 | 5·0–6·0 | 64 | 5·9 | 0·9 | 5·0–6·0 |
| C-peptide (pmol/l) | 95 | 1342 | 910 | 220–1400 | 56 | 1168 | 541 | 220–1400 |
| 25-Hydroxy-vitamin $D_3$ (nmol/l) | 95 | 38·6 | 26·8 | 50–150 | 63 | 37·5 | 23·7 | 50–150 |
| Retinol (μmol/l) | 97 | 1·59 | 0·55 | >0·7 | 61 | 1·33 | 0·63 | >0·7 |
| Tocopherol (μmol/l) | 84 | 21·8 | 4·8 | 14–50 | 54 | 22·5 | 5·7 | 14–50 |
| Se (μmol/l) | 96 | 0·78* | 0·16 | 0·6–1·8 | 53 | 0·72 | 0·16 | 0·6–1·8 |
| Zn (μmol/l) | 59 | 12·7 | 3·26 | 9·0–17·0 | 29 | 11·7 | 2·79 | 9·0–17·0 |
| Cu (μmol/l) | 81 | 22·63 | 3·84 | 12·0–25·0 | 49 | 24·81 | 3·98 | 12·0–25·0 |
| Ascorbic acid (μmol/l) | 30 | 56·6 | 30·2 | 45–92 | 10 | 58·4 | 32·2 | 45–92 |
| Thiamin (nmol/l) | 71 | 90·0 | 16·3 | 55–125 | 34 | 84·9 | 22·8 | 55–125 |

in general seemed restricted. The respondents, particularly the female addicts, showed a preference for unhealthy food items such as sweet snacks and sweet beverages. The nutrient density was lower for self-selected food than that received from friends/family and public/private charitable sources. Moreover, the intakes of vitamins and minerals were below the RI. The corresponding blood parameters were below, or in the lower part of the reference value range, supporting the findings of low food intake and poor food choices.

The challenges faced in carrying out the present study, and the ability of the respondents to participate, have been discussed in an earlier paper[2]. The estimation of the food intake had to be based on one single 24 h dietary recall, as it was impossible to ensure the respondents' attendance at a second interview. These limitations have been kept in mind when interpreting the results.

The 24 h dietary recall supported the assumption that the drug addicts' meal patterns were highly influenced by their general way of living, in which improvisation was the main strategy in the continuous hunt for drugs. Comparison with the results of a survey from the Norwegian population (NORKOST) shows that the drug addicts' energy intake was lower than that of the general population by an average of 23 %[18]. The male addicts' energy intake was 30 % higher than that of the female addicts. This is consistent with findings relating to the Norwegian population at large, which have shown mean male energy intake of 11·5 MJ and female intake of 8·2 MJ[18]. Forrester *et al.*[19] found that energy intake among drug addicts could be linked to homelessness and sickness. Studies of hospitalised drug addicts without organic pathology have reported an energy intake of 38 % lower than that found in the present study, explained by abstinence and nausea[4]. Sickness and other kinds of indisposition may cause variations in eating activities. A reduced supply of essential nutrients over a prolonged period may in itself contribute to sickness and reduced well-being. However, investigations have revealed neural similarities between non-homoeostatic eating, i.e. eating considerably less or more than needed, and drug abuse[20]. Chronic stress, for instance food restriction, may increase the response to drugs[21]. This may explain to some extent why so many drug addicts (>50 %) in the present study had a low PALie. Such non-homoeostatic eating patterns may provide an unconscious reward by increasing the response to the drugs used, but an equally valid explanation is that addicts prefer an intensified drug experience at the cost of satiety.

The drug addicts' total protein intake was approximately 6 % lower than the values reported in the NORKOST study[18]. In the study of Forrester *et al.*[19] of HIV-negative drug abusers, an observed reduced protein intake was exchanged with a higher intake of carbohydrate-rich food which was provided by homeless shelters and soup kitchens. Investigations of hospitalised drug addicts without organic pathology have reported a similar mean intake of protein as found among our respondents[4]. Half of the respondents in the present study had a protein intake below the accepted maintenance requirement of 0·66 g per kg body weight per d[22]. The insufficient protein intake was, however, a result of low food intake.

The proportion of energy from fat fell within the recommended values of 25–35 % of total energy intake, although the absolute amount was low due to low energy intake[17]. The intake of PUFA, however, was lower than the recommended 5–10 %. Low PUFA intake has been linked to aggressive behaviour among substance abusers[23]. In the present study, 10–20 % of the respondents showed serum concentrations of total cholesterol, HDL and LDL that were lower than the reference values, which support the calculated low fat intake[24]. Low serum cholesterol values have also been linked to an increased risk of relapse during detoxification[23].

The relative carbohydrate intake was 60 (SD 17) E% of the energy intake, as recommended in the Nordic Nutrition Recommendation[17]. The percentage of energy derived from added sugar exceeded the maximum recommended amount by a factor of 3 compared to the recommended maximum of 10 %. An excessive intake of sugar by the drug addicts was also indicated by the findings that more than 20 % of the respondents showed TAG concentrations above the upper reference value and that more than 10 % had an increased HbA1c saturation. In addition, approximately 30 % had C-peptide concentrations exceeding the reference values. The drug abuse by itself cannot explain the increased

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concentrations of markers for general high glucose concentrations[25]. The high intake of added sugar could explain the low dietary content of fibre and essential nutrients[17].

Studies have focused on the increasing preference and craving for sweet food items in connection with drug addiction, especially among heroin addicts[26,27]. In the present study, 85 % of respondents had used heroin during the preceding 24 h[2]. Studies have also revealed a prolonged period of abstinence from drugs, when excessive amounts of sugar are consumed[26]. Besides, a high intake of sugar in itself could increase an individual's response to drugs[9]. The addicts' preference for sugar was observed, in that the food they bought themselves had higher sugar content than the food they received from charitable sources, friends and family.

Only 20–30 % of the respondents had an intake of vitamins and minerals above the RI[17]. The males had a higher overall intake of vitamins and minerals than the females, similar to the results of the NORKOST study[18]. The low intake of vegetables and fruit implied a low intake of antioxidants. The blood biomarkers supported the low reported intake by low concentrations of vitamin D and vitamin C. Low serum concentrations of vitamins E, C and A among drug addicts were reported in another study, which concluded that antioxidant therapy could increase the chances of rehabilitation and a healthier life among the drug addicts[7]. The high serum Cu concentration that was seen in one-third of the respondents can be explained by infections and agrees well with the findings of elevated C-reactive protein concentrations reported earlier[2].

The male addicts in the present study, who reported not getting enough to eat, had a lower intake of energy than those who were satisfied with their food intake. The female respondents who were not satisfied with the amount of food showed lower PALei than those who reported that they got enough food. Accordingly, their experience of not having access to sufficient food seemed real. However, one might discuss a practice of leaving food purchasing to the drug addicts themselves, i.e. giving them more money, since their own food choice showed poor nutrient density.

### *Conclusion*

The results from the present study indicated a high risk of inadequacy of food and nutrient intake among heavy drug addicts, which seems to represent a health risk in itself. The drug addicts experienced limited access to food, and reported low food intake and unhealthy food choices. The dietary findings were supported by biomarkers. The food that addicts bought themselves was not as nutrient-dense as the food they received from friends/family and charitable organisations.

In the present study, the most striking features of the drug addicts' diets were the high intake of added sugar and the wide range of food amount intake. As presented previously, it has been documented that such dietary patterns and irregular eating may trigger inebriation mechanisms in the central nervous system, producing reinforced addiction and increased tolerance to drugs. It seems reasonable to assume that such dietary habits, together with the abuse of drugs, probably resemble a speeding roundabout, from which the addicts have the corresponding difficulties to jump off.

Further research on problems related to the diets of drug addicts should focus on both food content and dietary habits, and aim to uncover connections that may reinforce inebriation and addiction. Such connections, if neglected, can function as counter-productive forces in rehabilitation and treatment efforts.

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III

IV

# Appendix 1

Høgskolen i Akershus
Senter for helse-, sosial- og miljøforskning

# Høgskolen i Akershus
# i samarbeid med
# Feltpleien/Rusmiddeletaten i Oslo Kommune
## Ernæring og misbruk av rusmidler

**INFORMASJON TIL DELTAGERNE**
Dette er et sammendrag av den muntlige informasjonen du har fått for at både du og vi skal være innforstått med hva som nettopp er sagt.

Rusmiddeletaten og Feltpleien ønsker å få en vitenskapelig dokumentasjon av rusmisbrukeres ernærings- og helsetilstand. Derfor er dette samarbeidsprosjektet mellom Feltpleien/Rusmiddeletaten i Oslo og Høgskolen i Akerhus kommet i stand. Hensikten er å finne ut hva som kan gjøres for å forbedre rusmisbrukernes allmenntilstand gjennom å forbedre deres ernæringssituasjon. Vi vil utarbeide forslag til praktiske tiltak i forhold til mat og måltider spesielt tilrettelagt for rusmisbrukere. Vi setter pris på at du stiller opp. Uten innsats fra rusmisbrukernes side blir dette prosjektet umulig å gjennomføre. Samtidig håper vi at du finner det meningsfylt å skulle bidra til en mulig forbedring av egen ernæringstilstand. Du kan til enhver tid trekke deg fra prosjektet.

De opplysninger du gir, og de data du bidrar til, aldri skal kunne spores tilbake til deg av andre enn Feltpleien. De står ansvarlig for å gi en individuell tilbakemelding og oppfølging hvis resultatene tilsier at det trengs, eller hvis du ønsker å vite resultatene uansett. Datainnsamlingen vil foregå i tidsrommet fra oktober 2001 til og med februar 2002. Bearbeiding av resultatene vil ta noen måneder, så den første rapporten med kortsiktige og mer langsiktige forslag til endringer av kostholdet vil foreligge i mai 2002.

Når prosjektet er avsluttet, vil alle opplysninger bli anonymisert, våren (om fire).

Vi vil gjerne at du i utgangspunktet bestemmer deg for å delta i hele prosjektet. Hvis det underveis viser seg å bli for slitsomt/krevende for deg, så kan du når som helst trekke deg. Undersøkelsen omfatter:

- Måling av høyde og vekt
- Måling av kroppstemperatur med øretermometer
- Blodprøve
- Hårprøve
- Intervju etter spørreskjema på ca. 40 minutter hvor du blir spurt om hva du spiser samt spørsmål om berører din livssituasjon før og nå.

Behandlingsansvarlig: Arne Oshaug, Høsgkolen i Akershus, 1356 Bekkestua
Finansieringsinstitusjon: Rusmiddeletaten i Oslo og Høgskolen i Akershus
Databehandler: Mone Sæland, Høgskolen i Akershus, 1356 Bekkestua

Høgskolen i Akershus
Senter for helse-, sosial- og miljøforskning

# Høgskolen i Akershus
# i samarbeid med
# Feltpleien/Rusmiddeletaten i Oslo Kommune
## Ernæring og misbruk av rusmidler

Jeg bekrefter herved at jeg er informert og gir mitt samtykke til å delta i ovennevnte prosjekt:

:.....

Dato:.....

Behandlingsansvarlig: Arne Oshaug, Høsgkolen i Akershus, 1356 Bekkestua
Finansieringsinstitusjon: Rusmiddeletaten i Oslo og Høgskolen i Akershus
Databehandler: Mone Sæland, Høgskolen i Akershus, 1356 Bekkestua

# Appendix 2

# Høyde og vektmåling

**Høyde** måles mens kandidaten står med knær og føtter sammen, helene inntil veggen, strake ben, løftet hode og Frankfurter-planet (linjen fra øverste ørefeste frem til ytre øyekrok) i vannrett stilling. Husk å måle såletykkelse og trekk fra.

**Vekt**
Kandidaten veies med klær og sko på hvis de da ikke går i tøfler/annet skotøy som lett kan tas av. For tøy trekkes følgende fra:
Langbukse/dongry: kvinner = 700 gram, menn = 800 gram
Skjorte/T-skjorte/tynn genser: kvinner = 200 gram , menn = 300 gram
Tykk genser/Collage genser: kvinner = 400 gram, menn = 500 gram.
Jakke: tynn boblejakke = 800 gram
Kjole: 400 – 600 gram
Joggesko: kvinner = 600 gram, menn = 875 gram.
Tynne sko = 450 gram
Annet oppgis i tekst og veies senere før fratrekk i regnestykket. Tynne støvletter veier ca. 550 gram, gummistølver 1200 gram.
Netto kroppsvekt oppgis med en halv kilos nøyaktighet.

# Høgskolen i Akershus
# i samarbeid med
# Rusmiddeletaten i Oslo Kommune

**Ernæring og misbruk av rusmidler**
**Oslo - høsten 2001**

## Protokoll for prøvetagning

- blodprøver
- hårprøver
- måling av fettprosent med FUTREX

## Blodprøver

**Tabell 1:** ***Medium, volum, glass/plastrør og lab.***

| Medium | Volum ml | TappeGlass | Antall glass | Oppbevarings-glass Prøve | Oppbevares | Hentes/ Analyseres |
|---|---|---|---|---|---|---|
| Serum | 5 | Vac Rød | 2- 3* | Eppendorf | Ved – 70 gr.C | HiAk/HiAk |
| Helblod | 5 | Vac. Grå | 1 | Vac. Grå | Ved – 20 gr.C | HiAk/SRI |
| Serum | 2-3 | Vac. Rød | 1-2** | Eppendorf **C-vitamin** | Ved – 70 gr.C | HiAk/Ern.la.Ake |
| Serum | 9 | Gule gelglass | 4 | Gul gel | I kjøleskap på stedet | Av Fürst dagen etter |
| Helblod | 2 | Vac. Grønn | 1 *** | Vac. Grønn **B1** | Ved – 20 gr.C | HiAk/Ern.la.Ake |
| Helblod | 4,5 | EDTA-glass | 1 | EDTA-glass | I kjøleskap på stedet | Av Fürst dagen etter |
| Serum | 2-3 | Vac Rød | 1-2 **** | Eppendorf **B6** | Ved –20 gr.C | HiAk/Ern.la.Ake |
| Serum | 1 | Vanlig gelglass | 1 | Vanlig gelglass **C-peptid** | Ved – 20 gr.C | HiAk/Horm.la.A |
| Helblod | 2 | Vak.glass med rød kork | 1 | Vak.glass med rød kork **Tungmetaller** | Ved 20 gr. C | HiAk/NINA |
| Plasma | 2 | EDTA-glass: 4,5 ml helblod gir ca. 2 ml serum | 1 | Plastglass NB! Merkes **EDTA-plasma** | I kjøleskap på stedet | Av Fürst dagen etter |

Totalt: 21 ml serum tilsvarende ca. 42 ml helblod + 18 ml helblod = 60 ml

*** I kjølebag for transport til Stabekk. Pipeteres dagen etter av Terje**

**** Pipeters etter sentrifugering og legges på tørris. Fryses videre på Stabekk**

***** I kjølebag på stedet. Fryses videre på Stabekk.**

**Tabell 2:** *Tungmetallanalyse i hår (0,1 g hår, se modell)*

| Tungmetall | NB! Prøvenr. + Id.nr. |
|---|---|
| Hg | |
| Pb | |
| Cd | |
| Mn | |

# Prøver til Fürsts laboratorier

**9 ml serum fordelt på 4 gule gelglass**
**Ett EDTA glass 4,5 ml**
**Ett "serumplastglass" merket EDTA-plasma ca. 2 ml**
**Analysereoversikt bakerst, se tabell 3**

# Prøver til Laboratoriet på Stabekk

**5 ml serum til fryselagring (-80 gr.C) og analyse på laboratoriet på Stabekk.**
Glassene settes i kjøleskap på HiAk's lab om kvelden. Terje tar seg av avpipetering, endelig merking osv. dagen etter.

# RUSMILDER I BLOD

**Analyseres ved Statens Rettstoksikologiske institutt (SRI)**
**Kontaktperson: Karen Sofie Engelstad, 22042764, 924 47 975.**

## 2-5 ml helblod i et til to glass med grå kork

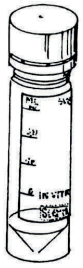
## VIKTIG! At prosedyrer følges til punkt og prikke, da både skjema og glass skal avleses optisk.

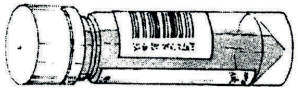
**I. Tapping av blod**
**NB! Ikke sett klistrelapp på glasset *før* en har tappet blod i det, for et tomt glass med klistrelapp må kastes. En kan ikke sette flere klistrelapper utenpå/oppå hverandre.**
Ta av klistremerker nederst på rekvisisjonsskjemaet og lim fast på glass(-ene) etter at blodprøven er tatt, slik at koden med bokstaver og tall blir leselig i glassets lengderetning, fra grå kork og utover mot glassets bunn, se illustrasjon på baksiden av det løse instruksjonsarket. Husk å merke alle glass som det er blod i.

**II. Plassering i plastboks**
En plastboks benyttes for hver person, hvor hvert glass i boksen er merket med klistremerke fra rekvisisjonsskjemaet. Tomme glass fjernes fra boksen før den lukkes. Et tilsvarende merke klistres på toppen av lokket og én på siden som forsegling.
Boksen anbringes i kjøleskap natten over før den fryses ved ca. 20 minusgrader Celsius.

**Fortsetter neste side**

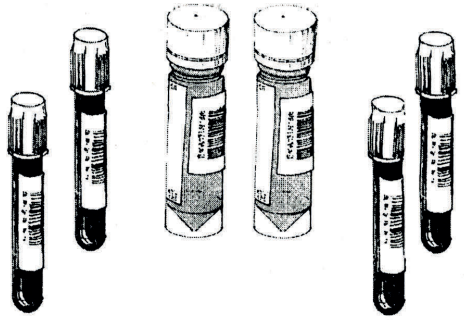
1





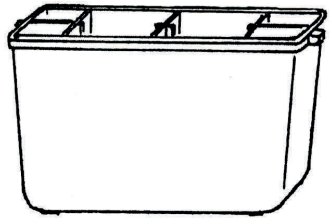
Etiketten settes på med prøvenummeret i lengderetningen.

2



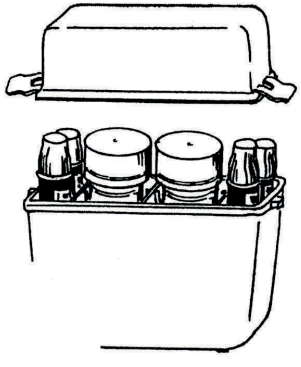
Korken skrus godt på

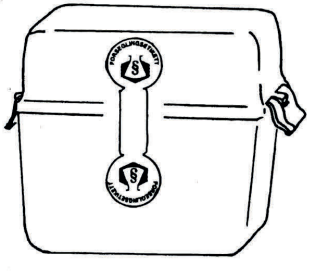
Rørene plasseres i esken.



3

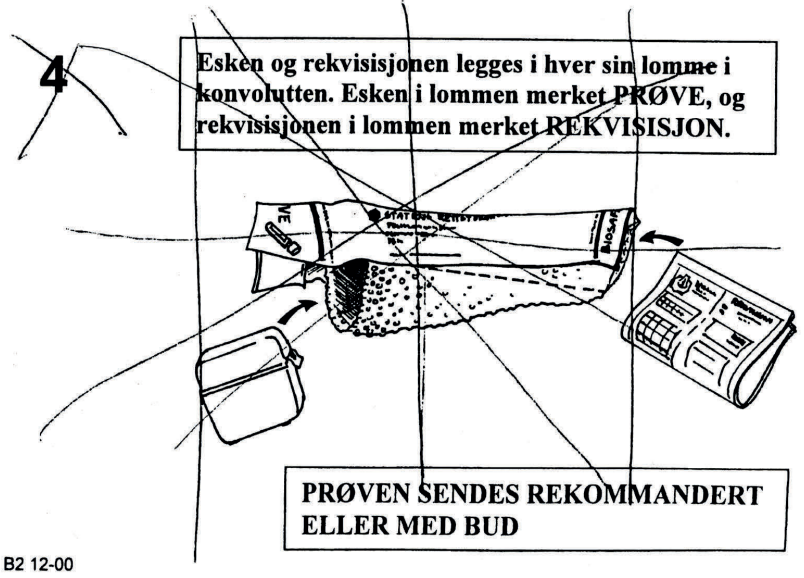
Lokket settes på, esken lukkes og forsegles med forseglingsetiketten.





4

Esken og rekvisisjonen legges i hver sin lomme i konvolutten. Esken i lommen merket PRØVE, og rekvisisjonen i lommen merket REKVISISJON.



PRØVEN SENDES REKOMMANDERT ELLER MED BUD

B2 12-00

**III. Utfylling av skjema**

**Benytt ett skjema** for hver person: skriv den ***firesifrete IDnr*** helt til venstre i rubrikken for ***Prøvegivers etternavn***, og bare ett tall i hvert bokstavfelt.

Hopp til Annet nedenfor midten og sett et kryss på Annet, og skriv Ernæringsprosjekt under rubrikken Spesifisér.

I rubrikken nederst til venstre Prøve A tatt, ev. Prøve B, føres datoen inn: dag, måned og fullstendig årstall åtte siffer totalt.

Rekvisisjonsskjemaet bør også merkes PROSJEKT øverst i høyre hjørne med rød tusj, slik at det blir lett å kjenne igjen for personalet på SRI.

Riv av hovedskjema og legg det i konvolutt merket Til SRI. Kopien settes i perm. Rekvisisjonsskjemaene samles i en felles konvolutt som leveres sammen med prøvene. Ca. 25 av gangen er et passende antall. Ta kontakt med Karen Sofie på SRTI (se ovenfor) og avtalt tid for levering på forhånd.

# Vitamin C og vitamin B6 i serum

**Analyseres av Ernæringslaboratoriet ved Aker sykehus**
**Kontaktperson: Berit Falch tel: 22894966.**

## 1-2 ml serum i hver sitt Eppendorfrør.
## Prøven til ascorbinsyreanalyse fryses ned ved min. 70 minusgrader C.
## Prøven til B6 kan fryses ved minus 20 gr. C.

**I. Tapping av blod og avpipetering**

**8 – 10 ml blod tappes i BD Vacutainer-rør med rød kork. Sentrifugeres, pipeters over i Eppendorfrør og kjøles legges på tørris (vit. C), legges i kjølebag (vit. B6). Bør fryses innen 3 timer.**
**NB! Merk alle Eppendorfrørene med den IDnr, og C-vitaminanalyse (tørris) eller B6-analyse (kjøleboks).**

**II. Oppbevaring**

**Prøvene anbringes i stativ i kjølebag med kjøleelementer (B6) eller i isoporkasse med tørris (C-vitamin) og fraktes til laboratoriet på Stabekk samme kveld for innfrysing. Alle prøver samles for én felles levering på Aker. Ring på forhånd og avtal reveringstid. Husk å ta med utfylte skjemaer. Analysesvar kan påregnes etter vel en uke.**

**III. Utfylling av skjema**

**Noter ned tidspunkt og dato for prøvetagning samt IDnr. og hva slags analyse som ønskes. (Samme skjema som for tiaminanalyse).**

# Tiamin (Vitamin B1) i helblod

**Analyseres av Ernæringslaboratoriet ved Aker sykehus**
**Kontaktperson: Berit Falch tel: 22894966.**

**2-3 ml helblod i 2 ml Vacutainer rør med grønn kork. Nedkjøles direkte i kjølebag. Fryses ved min. 20 minusgrader på Stabekk.**

**Samles og levers ernæringslabben på Aker sykehus sammen med vitamin C og B6.**

# C-peptid i serum

**Analysreres av Hormonlaboratoriet ved Aker sykehus**

**Ca. 1- 2 ml serum, vanlig gelglass**

La stå i romtemperatur ca. 30 minutter, sentrifugeres og settes i kjølebag. Fryses på Stabekk ved ca. 20 minusgrader og sendes samlet til Hormonlaboratoriet på Aker.

# Tungmetaller i blod og hår

**Analyseres ved NINA, kontaktperson Syverin Lierhagen, tel: 73801572**

**Blodprøve**

**2 ml helblod i glass (ikke plastrør) uten tilsetninger. Pass på at korken ikke avgir metaller. Merkes med , Llpnr. Fra NINA og IDnr.**

**Kan oppbevares i kjøleskap eller fryser max. 20 minusgrader. Skal dekomponeres og kan således sendes som vanlig post uten kjøling. Selv om prøven råtner, forsvinner ikke tungmetallene.**

**Fyll ut skjema hvor Llnr/IDnr står, og fyll inn hvilke stoffer det skal analyseres for: I blod: Hg, Cd, Pb og Mn, Zn, Cu og Se. Dette overføres siden til E-mail.**

**Hårprøve**

**0,1 gram hår (underhår fra bak øret) pakkes i spesialemballasje/liten gjennomsiktig plasteske med hvitt lokk, og fryses ned for felles forsendelse etter avtale med Syverin på NINA.**

**Fyll ut på eget skjema under eget Llpnr. og samme IDnr. og marker for tungmetallanalyse i hår: Hg, Cd, Pb og Mn.**

**Tabell 5: Analyser i blod/serum og sted for analyse**

| Parameter | Prøve medium | Analyse/LAB |
|---|---|---|
| **Hb** | Helblod | Fürst |
| **Erytrocytter** | EDTA-blod | Fürst |
| **Leucocytter** | EDTA-blod | Fürst |
| **Hematokritt** | EDTA-blod | Fürst |
| **MCV** | EDTA-blod | Fürst |
| **MCH** | EDTA-blod | Fürst |
| **Kalium** | Serum | Fürst |
| **Natrium** | Serum | Fürst |
| **Kalsium** | Serum | Fürst |
| **Magnesium** | Serum | Fürst |
| **Jern/TIBC** | Serum | Fürst |
| **Ferritin** | Serum | Fürst |
| **Gamma-GT** | Serum | Fürst |
| **Bilirubin** | Serum | Fürst |
| **ASAT** | Serum | Fürst |
| **ALAT** | Serum | Fürst |
| **Amylase total** | Serum | Fürst |
| **Triglycerider** | Serum | Fürst |
| **Kolesterol** | Serum | Fürst |
| **HDL** | Serum | Fürst |
| **LDL** | Serum | Fürst |
| **CRP** | Serum | Fürst |
| **Protein total** | Serum | Fürst |
| **Albumin** | Serum | Fürst |
| **Glukose F** | Serum | Fürst |
| **Urinsyre** | Serum | Fürst |
| **Kreatinin** | Serum | Fürst |
| **TSH** | Serum | Fürst |
| **T 4** | Serum | Fürst |
| **Vitamin B 12** | Serum | Fürst |
| **Folat i serum** | Serum | Fürst |
| **HIV** | Serum | Fürst |
| **Hepatitt A,B og C** | Serum | Fürst |
| **Glyko Hb** | EDTA-blod | Fürst |
| **Ery-folat** | EDTA-blod | Fürst |
| **Parameter** | **Prøve medium** | **Analyse/LAB** |
| **Vitamin A** | Serum | Fürst |
| **Vitamin D:25-OH D3** | Serum | Fürst |
| **MMA (metyl-malon-syre)** | Serum | Fürst |
| **C-peptid (må avklares)** | Serum 2ml | Aker Horm.lab |
| **Sink** | Helblod | NINA |
| **Selen** | Helblod | NINA |
| **Kopper** | Helblod | NINA |
| **Tiamin-di-fosfat** | Helblod, ikke gelglass | Aker |
| **B6** | Serum | Aker |
| **Vitamin C** | Serum | Aker |
| **Homocystein** | 2,5 mlSerum | HiAk |
| **TEAC** | 2,5 mlSerum | HiAk |
| **25 rusmidler** | 5 ml helblod | SRI |
| **Hg, Pb, Mn, Cd** | Helblod | NINA |

# Appendix 3

ID-nr ☐☐☐☐ Vet ikke=98
Ikke svart=99

**Høgskolen i Akershus**
**i samarbeid med**
**Kirkens bymisjon**

**Intervjuskjema for prosjektet Ernæring og rusmiddelavhengighet**
**Oslo - våren 2003**

**1. Intervjuobjektets ID-nr** ..... .....☐☐☐☐

**2. Dato**..... ..... ..... ☐☐.☐☐.☐☐

**3. Sted for intervju /blodprøvetaking**..... ..... ☐☐
Skippergata =1, Kongens gate = 2, Urtegata = 3, Natthjemmet =4, Dalsbergstien = 5, Pro-Senteret = 6, Marcus Thranes Hus = 7, Ila hybelhus = 8, Fagerborg = 9, Josefines hus =10, Thereses Hus = 11, Bryn = 12, Annet = 13……., Natthjemmet = 20, Møtestedet = 21.

**4. Alder i år**: ..... ..... .....☐☐ år

**5. Kjønn**..... ..... .....Male ☐ Female ☐

**6. Vekt med klær på:** ..... ..... ..... ☐☐☐,☐ kg

**7. Fratrekk for klær** ..... Kvinner/Menn .....
Langbukse/dongry: ... 0,7/0,8 kg.....☐,☐kg
Skjorte/T-skjorte/ tynn genser: 0,2/0,3 kg.....☐,☐kg
Tykk genser: 0,4/0,5kg.....☐,☐kg
Jakke: 0,8kg..... .....☐,☐kg
Kjole: 0,4 – 0,6kg..... .....☐,☐kg
Joggesko: 0,6/0,9 kg. .....☐,☐kg
Tynne sko: 0,5 kg ..... .....☐,☐kg
Annet ..... .....☐,☐kg

**8. Netto vekt** ..... ..... ..... =☐☐☐,☐kg

**9. Kroppsbygning**..... Small☐.....Medium☐ .....Large☐
(Se instruksjon på oransje målelinjal av hardplast)

**10. Høyde cm**..... ☐☐☐,☐ – fratrekk sko ☐,☐ cm = ☐☐☐,☐cm

**11. Overarms omkrets på ikke dominant arm** ..... ..... ☐☐,☐

**12. Har tatt blodprøve? ..... (Husk merking av glass og skjemaer med IDnr.)**.....☐☐
0 = Nei, 1 = Ja .....
Hvis Nei, hvorfor? (Sett kryss eller skriv)

**12.1 Fant ikke blodårer**.....☐
**12.2 Annet**……..

**13. Har tatt hårprøve? ..... (Husk merking av boks IDnr)** 0 = Nei, 1 = Ja .....☐☐
**13.1 Vasket håret med flasshampo** 0 = Nei, 1 = Ja.....☐
**13.2 Farget håret** 0 = Nei, 1 = Ja.....☐

**14.** Bioingeniør: nr. + signatur ..... ..... ☐
1=Gørild, 2=Tove, 3=Ann-Mari, 4=Olav

HIT BIOINGENIØRER!! START INTERVJU

**15. Intervjuer:**..... ..... ..... ☐
1=Renate, 2=Therese, 3=Marit, 4=Mone

**16. Røyker du?**..... ..... .....☐☐
0 = Nei, 1 = Ja

**17. Intervju start:** ..... ..... kl .....☐☐.☐☐

**18. Intervju stopp:** ..... ..... kl.....☐☐.☐☐

**19. Deltakelse** ..... ..... .....☐☐
1……..10

**20. Hvilken bydel/sosialkontor tilhører du?:** ..... .....☐☐
Bjerke = 20, Bygdøy – Frogner = 01, Bøler = 11, Ekeberg-Bekkelaget = 07,
Furuset = 16, Gamle - Oslo =06, Grefsen-Kjelsås = 21, Grorud = 19,
Grünerløkka-Sofienberg =05, Hellerud = 15, Helsfyr-Sinsen = 14,
Lambertseter = 10, Manglerud = 12, Nordstrand = 08, Romsås = 18,
Røa = 24, Sagene - Torshov = 04, Sogn = 22, St.Hans Haugen-Ullevål = 03,
Stovner = 17, Søndre – Nordstrand = 09, Ullern = 25, Uranienborg –Majorstuen = 02,
Vinderen = 23, Østensjø = 13, Utenbys = 26 (hvor……..)

## Gjør 24 timers kostintervju nå!!!!! ..... Skjemaene ligger bak!

**21. Det du har svart i kostintervjuet, er det slik du pleier å spise?** .....☐☐
0 = Nei, 1 = Ja
**Hvis Nei, hvorfor ikke:**
*Marker svar(ene) de gir uoppfordret med **1 (ja)***
**21.1** Sykdom ..... .....☐
**21.2** Dårligere matlyst enn vanlig .....☐
**21.3** Mangler tenner . .....☐
**21.4** Tatt amfetamin . .....☐
**21.5** Selskap/julebord/annen spesiell anledning.....☐
**21.6** Annet…….

**22. Føler du at du får i deg nok mat?** ..... ..... ☐☐
0 = Nei, 1 = Ja
**Hvis Nei, hvorfor tror du det blir for lite?**
*Marker svar(ene) de gir uoppfordret med 1 (ja)*
**22.1** Mangler matlyst . ..... ☐
**22.2** Mangler penger... ..... ☐
**22.3** Mangler mat ..... ..... ☐
**22.4** Liker ikke det jeg får ..... ☐
**22.5** Dårlige tenner ..... ..... ☐
**22.6** Annet……

**23. Hva er de viktigste grunnene til at du spiser?**
*Spør også om de kategoriene som ikke svares automatisk, og bruk*
0 = Aldri, 1 = Sjelden, 2 = Av og til, 3 = Ofte, 4 = Alltid
**23.1 Er sulten**..... ..... ..... ☐☐
**23.2 Er glad i/har lyst på mat/matglede**..... ..... ☐☐
**23.3 Hyggelig å spise sammen med andre** ..... ..... ☐☐
**23.4 Unngå å bli syk**.. ..... ..... ☐☐
**23.5 Vet jeg trenger det** ..... ..... ☐☐
**23.6 Annet**……..

**24. Hvordan skaffer du deg mat?**
*Spør også om de kategoriene som ikke svares automatisk, og bruk* :
0 = Aldri, 1 = Sjelden, 2 = Av og til, 3 = Ofte, 4 = Alltid
**24.1 Kjøper selv**..... ..... ..... ☐☐
**24.2 Får av kjæreste, samboer, ektefelle**..... ..... ☐☐
**24.3 Får fra privat/offentlig giver (se egen liste)** ..... ..... ☐☐
**24.4 Får av søsken/foreldre/besteforeldre/barn** ..... ..... ☐☐
**24.5 Får av venner** .... ..... ..... ☐☐
**24.6 Stjeler** ..... ..... ..... ☐☐
**24.7 Spiser på restaurant, kafé** ..... ..... ☐☐
**24.8 Finner i boss/søppel** ..... ..... ☐☐
**24.9 Annet**……

**25. Har du mulighet til å lage varm mat?** ..... ..... ☐☐
0 = Nei, 1 = Ja
**25.1 Hvis Ja, hvor ofte gjør du det?** ..... ..... ☐☐
0 = Aldri/Sjeldent (< 1 g. Pr. mnd), 1 = 1g/mnd, 2 = 2g/mnd, 3 = 3 g/mnd,
4 = 1g/uke, 5 = 2-3-g/uke, 6 = 4–5 g/uke, 7 = 6–7 g/uke
**25.2 Hvis Nei, skulle du ønske at du hadde anledning til å koke mat**? ..... ☐☐
0 = Nei, 1 = Ja

**26. Har du kjøleskap du kan bruke?** ..... ..... ☐☐
0 = Nei, 1 = Ja
**26.1 Hvis Nei, skulle du ønske at du hadde**?..... ..... ☐☐
0 = Nei, 1 = Ja

**27. Vasker du hendene før du spiser? .....** ..... ☐☐
0 = Aldri, 1 = Sjelden, 2 = Av og til, 3 = Ofte, 4 = Alltid

**28. Er du spesielt glad i mat og drikke som smaker søtt?** ..... ..... ☐☐
0 = Nei, 1 = Ja
**Hvis Ja, hvorfor tror du det er slik?**
*Marker svar(ene) de gir uoppfordret med **1 (ja)***
**28.1** Liker smaken ..... ..... ☐
**28.2** Får mer krefter .... ..... ☐
**28.3** Gir en bedre/roligere rus ..... ☐
**28.4** Føler meg gladere til sinns..... ☐
**28.5** Annet ……

**29. Spiser du mat når du har abstinens?**..... ..... ☐☐
0 = Aldri, 1 = Sjelden, 2 = Av og til, 3 = Ofte, 4 = Alltid

**29.1 Hvis bekreftende svar, hjelper det deg mot abstinensplagene?** ..... ☐☐
0 = Aldri, 1 = Sjelden, 2 = Av og til, 3 = Ofte, 4 = Alltid

**30. Hva slags stoff pleier du vanligvis å ta?**

*Marker svar(ene) de gir uoppfordret med **1 (ja)***

**30.1** Heroin (junk, hest) ☐
**30.2** Amfetamin (speed) ☐
**30.3** Hasj /Cannabis (bønner, tjall) ☐
**30.4** Rohypnol (hypper) ☐
**30.5** Benzodiacepiner:
(Valium/ Stesolid, Apodorm, Flunipam,
Mogadon, Rivotril, Somadril, Sobril, Vival, Serepax) ☐
**30.6** Morfin ☐
**30.7** Lynol/lim ☐
**30.8** Dolcotin ☐
**30.9** Kodein ☐
**30.10** Metamfetamin ☐
**30.11** Kokain ☐
**30.12** Paralgin forte ☐
**30.13** Trancopal ☐
**30.14** Lobac ☐
**30.15** GHB ☐
**30.16** Ecstasy ☐
**30.17** LSD ☐
**30.18** Subutex ☐
**30.19** Temgesic ☐
**30.20** Metadon ☐
**30.21** Annet……

**31. Har du tatt stoff siste døgn?** ..... ☐☐

0 = Nei, 1 = Ja

**Hvis Ja, hva slags stoff har du tatt og hvor mye?**

*Marker svar(ene) de gir uoppfordret med 1 (ja) og spør etter mengden de totalt tok siste døgn.*

**31.1** Heroin (junk, hest) ☐ 31.11☐☐☐☐mg
**31.2** Amfetamin (speed) ☐ 31.21☐☐☐☐mg
**31.3** Hasj /Cannabis (bønner, tjall) ☐ 31.31☐☐☐☐mg
**31.4** Rohypnol (hypper) ☐ 31.41☐☐☐☐mg
**31.5** Benzodiacepiner:
(Valium/ Stesolid, Apodorm, Flumipan,
Mogadon, Rivotril, Somadril) ☐ 31.51☐☐☐☐mg
**31.6** Morfin ☐ 31.61☐☐☐☐mg
**31.7** Lynol/lim ☐ 31.71☐☐☐☐mg
**31.8** Dolcotin ☐ 31.81☐☐☐☐mg
**31.9** Kodein ☐ 31.91☐☐☐☐mg
**31.10** Metamfetamin ☐ 31.101☐☐☐☐mg
**31.11** Kokain ☐ 31.111☐☐☐☐mg
**31.12** Paralgin forte ☐ 31.121☐☐☐☐mg
**31.13** Trancopal ☐ 31.131☐☐☐☐mg
**31.14** Lobac ☐ 31.141☐☐☐☐mg
**31.15** GHB ☐ 31.151☐☐☐☐mg
**31.16** Ecstasy ☐ 31.161☐☐☐☐mg
**31.17** LSD ☐ 31.171☐☐☐☐mg
**31.18** Subutex ☐ 31.181☐☐☐☐mg
**31.19** Temgesic ☐ 31.191☐☐☐☐mg
**31.20** Metadon ☐ 31.201☐☐☐☐mg
**31.21** Annet……

**32. Hvordan tar du vanligvis stoff?**

*Marker svar(ene) de gir uoppfordret med **1 (ja)**.*

**32.1** Intravenøst ☐
**32.2** Intramuskulært ☐
**32.3** Subkutant ☐
**32.4** Via munnen (peroralt) ☐
**32.5** Via endetarmen (supp) ☐
**32.6** Inhalasjon/røyking ☐
**32.7** Sniffing ☐
**32.8** Annet

**Spørsmål 33- 38 er bare for dem som setter sprøyter**
**Ikke sprøytebrukere: hopp til 41**

**33. Brukte du askorbinsyre eller sitronsaft i skuddene siste døgn**? ..... ☐☐

0 = Nei, 1 = Ja askorbinsyre, 2 = sitronsaft, 3=sitronsyre

**Hvis Ja askorbinsyre:**

**33.1 Hvor mye askorbinsyre (siste døgn, se porsjonspakker)** .....☐☐☐☐ mg

**34. Hvor mange år har du satt sprøyter?** ..... ..... ☐☐år

**35. Vasker du hendene eller bruke Desi-skum før du setter sprøyter?** ..... ☐☐
0 = Aldri, 1 = Sjelden, 2 = Av og til, 3 = Ofte, 4 = Alltid

**36. Brukte du alko-tip i går?** ..... ..... ☐☐
0 = Nei, 1 = Ja

**37. Sleiker du på sprøytespissen?** ..... ..... ☐☐
0 = Aldri, 1 = Sjelden, 2 = Av og til, 3 = Ofte, 4 = Alltid

**38. Hvor tok du vann fra i går for å løse opp stoffet?**
*Marker svar(ene) de gir uoppfordret med **1 (ja)***
**38.1** Springen ..... ..... ☐
**38.2** Dispenser ..... ..... ☐
**38.3** Utefontene..... ..... ☐
**38.4** Drikkefontene ..... ..... ☐
**38.5** Apoteket (sterilt). ..... ☐
**38.6** Sølepytt ..... ..... ☐
**38.7** Toilettskål ..... ..... ☐
**38.8** Annet……..

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**Fortsett intervju med ALLE herfra!!**

**39. Hvor gammel var du da du startet med å bruke stoff/dop?**... ..... ☐☐år

**40. Føler du at rusmisbruket styrer livet ditt?**……☐
0 = Nei, 1 = Ja
**40.1 Hvis Ja, hvor gammel var du da rusen tok styring over livet ditt?**..... ☐☐år

**41. Hender det at du har angst?**.....……☐
0 = Aldri, 1 = Sjelden, 2 = Av og til, 3 = Ofte

**42. Opplever du å ha/hatt lengrevarende depresjoner/perioder med nedtrykkethet? .**☐
0 = Aldri, 1 = Sjelden, 2 = Av og til, 3 = Ofte

**43. Har du noen gang hatt selvmordstanker?** ……..☐
0 = Aldri, 1 = Sjelden, 2 = Av og til, 3 = Ofte

**44. Har du forsøkt å ta livet av deg**?.....……..☐
0 = Nei, 1 = Ja
**44.1 Hvis Ja, hvor mange selvmordsforsøk**?……..☐☐

**45. Har du noen gang gått i overdose slik at du trengte hjelp for å overleve?**..... .....……☐
0 = Nei, 1 = Ja
**45.1 Hvis Ja, hvor mange ganger?** ..... ..... ☐☐☐

**45.2 Hvor gammel var du første gang du gikk i overdose?** ..... ☐☐år

**46. Har du i løpet av det siste året hatt opphold på:**
0 = Nei, 1 = Ja
**46.1 Behandlingssted** ..... ☐ ..... **46.11** ☐☐ Dager
**46.2 Fengsel** ..... ..... ☐ ..... **46.21** ☐☐ Dager
**46.3 Vanlig sykehus** .. ..... ☐ ..... **46.31** ☐☐ Dager
**46.4 Psykiatrisk sykehus** ..... ☐ ..... **46.41** ☐☐ Dager
**46.5 Annet**……..

**47. Er du plaget med abcesser nå?** ..... ..... ☐
0 = Nei, 1 = Ja

**48. Er du smittet av:**
*Spør også om de kategoriene som ikke svares automatisk, og bruk* :
0 = Nei, 1 = Ja,
**48.1 Hepatitt A**..... ..... ..... ☐
**48.2 Hepatitt B**..... ..... ..... ☐
**48.3 Hepatitt C**..... ..... ..... ☐
**48.4 HIV/AIDS**..... ..... ..... ☐

**49. Er du vaksinert for:**
*Spør også om de kategoriene som ikke svares automatisk, og bruk* :
0 = Nei, 1 = Ja,
**49.1 Hepatitt A**..... ..... ..... ☐
**49.2 Hepatitt B**..... ..... ..... ☐

**50. Har du vært syk de siste 14 dagene?** ..... ..... ☐
0 = Nei, 1 = Ja
**Hvis Ja, hva slags sykdommer?**
*Marker svar(ene) de gir uoppfordret med **1 (ja)***
**50.1** Forkjølelse /influensa..... ☐
**50.2** Tannverk ..... ..... ☐
**50.3** Hodepine ..... ..... ☐
**50.4** Kvalme ..... ..... ☐
**50.5** Illebefinnende/slapphet..... ☐
**50.6** Feber ..... ..... ☐
**50.7** Diaré ..... ..... ☐
**50.8** Lungebetennelse ..... ☐
**50.9** Forstoppelse ..... ..... ☐
**50.10** Blodpropp ..... ..... ☐
**50.11** Annet……..

**51. Har du noen langtidssykdommer** ..... ..... ☐
0 = Nei, 1 = Ja
**Hvis Ja, hva slags sykdommer?**
*Marker svar(ene) de gir uoppfordret med **1 (ja)***
**51.1** Diabetes mellitus type 1 ..... ☐
**51.2** Diabetes mellitus type 2 ..... ☐
**51.3** Hjerte-kar-sykdom ..... ☐
**51.4** Epilepsi ..... ..... ☐
**51.5** Psoriasis ..... ..... ☐
**51.6** Stoffskiftesykdommer (hyperthyreosis etc.) ..... ☐
**51.7** AD/HD ..... ..... ☐
**51.8** Astma ..... ..... ☐
**51.9** Bronkitt ..... ..... ☐
**51.10** Magekatarr/Tarmkatarr ..... ☐
**51.11** Magesår ..... ..... ☐
**51.12** Skrumplever/Levercirrhosis ..... ☐
**51.13** Pancreatitt - bukspyttkjertel betennelse ..... ☐
**51.14** Annet …….

**52. Tar du noen medisiner mot sykdom?** ..... ..... ☐
0 = Nei, 1 = Ja
**Hvis Ja, hva slags medikamenter?**
*Marker svar(ene) de gir uoppfordret med **1 (ja)***
**52.1** Subutex ..... ..... ☐
**52.2** Metadon ..... ..... ☐
**52.3** Antibiotika ..... ..... ☐
**52.4** Fragmin (blodfortynnende) ..... ☐
**52.5** Ritalin ..... ..... ☐
**52.6** Epinat/Rivotril/Tegretol (krampeløsende) ..... ☐
**52.7** Tyroxin ..... ..... ☐
**52.8** Antidiabeticum (piller) ..... ☐
**52.9** Insulin ..... ..... ☐
**52.10** Antihistamintabletter ..... ☐
**52.11** Inhalasjon mot astma ..... ☐
**52.12** Annet…….

**Spørsmål 55 er bare for kvinner**

**53. Har du regelmessig menstruasjon?** ..... ..... ☐
0 = Nei, 1 = Ja
**53.1 Hvis *Nei,* hvor mange måneder er det siden sist du hadde menstruasjon? ..... ..... .....** ☐☐mnd
**53.2 Hvis *Ja*, hvor mange dager varer vanligvis din blødning**? ..... ☐☐dager

**NB; spør både kvinner og menn**

**54. Har du sex med partner?.....** ☐
0 = Nei, 1= Ja
**Hvis bekreftende svar, når og evnt. hvilken prevensjon bruker du?**
***Marker svar(ene) de gir uoppfordret med tall*** **.....Type prevensjon**
1= spiral, 2 = kondom
3= P-sprøyte, 4= Annet
**54.1** På jobb ..... ☐ ☐
**54.2** Privat ..... ☐ ☐

**55. Oppsøker du Feltpleien** ? ☐
0 = Aldri, 1 = Sjelden, 2 = Av og til, 3 = Ofte, 4 = Alltid
**Hvis bekreftende svar, hvorfor gjør du det?**
*Marker svar(ene) de gir uoppfordret med **1 (Ja)***
**55.1** Bekymret for helsen/helseundersøkelse ☐
**55.2** Stell av sår og byller ☐
**55.3** Hjelp til videre kontakt med hjelpeapparatet ☐
**55.4** Informasjon/forebygging ☐
**55.5** Behov for noen å snakke med ☐
**55.6** Vaksine ..... ☐
**55.7** Annet .....

**56. Oppsøker du lege/legevakt eller lignende <u>på egenhånd</u>** ? ☐
0 = Aldri, 1 = Sjelden, 2 = Av og til, 3 = Ofte, 4 = Alltid
**Hvis bekreftende svar, hvorfor gjør du det?**
*Marker svar(ene) de gir uoppfordret med **1 (Ja)***
**56.1** Helseundersøkelse ☐
**56.2** Resept på medikamenter ☐
**56.3** Hjelp til videre kontakt med hjelpeapparatet ☐
**56.4** Akutte smerter .... ☐
**56.5** Vaksine ..... ☐
**56.6** Annet .....

**57. Hvor lenge er det siden sist du var hos tannlege ? (**Antall måneder)..... ☐☐☐mnd

**58. Hvem bodde du sammen med i alderen 10 – 16 år?**
*Marker svar(ene) de gir uoppfordret med **1 (Ja)***
**58.1** Hos foreldre ..... ☐
**58.2** Hos fosterforeldre. ☐
**58.3** Hos besteforeldre ☐
**58.4** Hos søsken ..... ☐
**58.5** På institusjon..... ☐
**58.6** Internatskole ..... ☐
**58.7** Andre slektninger ☐
**58.8** På rømmen ..... ☐
**58.9** Annet ……

**59. Pleide du å spise frokost før du gikk på skolen da du var liten?** ..... ☐
0 = Aldri, 1 = Sjelden, 2 = Av og til, 3 = Ofte, 4 = Alltid

**60. Pleide du å ha med deg nistemat på skolen da du var liten?**.. ..... ☐
0 = Aldri, 1 = Sjelden, 2 = Av og til, 3 = Ofte, 4 = Alltid

**61. Fikk du noen slags psykiatrisk/psykologisk hjelpe i løpet av skolegangen**? ..... ☐
0 = Nei, 1 = Ja
**Hvis Ja, på hvilken måte?**
*Spør også om de kategoriene som ikke svares automatisk, og bruk* :
*0 = Nei, 1 = Ja*
**61.1 I kontakt med skolerådgiver/sosiallærer** ..... ..... ☐
**61.2 I kontakt med PP-tjenesten (pedagogisk-psykologisk tjeneste)** ..... ☐
**61.3 I kontakt med BUP (barne- og ungdomspsykiatrisk poliklinikk)**..... ☐
**61.4 Gikk hos privatpraktiserende psykolog/psykiater** ..... ..... ☐
**61.5 Var dagpasient på psykiatrisk institusjon (BUPA)** ..... ..... ☐
**61.6 Innlagt på psykiatrisk sykehus**..... ..... ☐
**61.7 Annet ……**

**62. Hvor har du bodd den siste måneden?**
*Marker svar(ene) de gir uoppfordret med **1 (ja)***
**62.1** I egen bolig/leilighet/hybel **.....** ☐
**62.2** På hospits ..... ..... ☐
**62.3** Hybelhus ..... ……..☐
**62.4** Natthjem ..... ……..☐
**62.5** Venner/familie .... ..... ☐
**62.6** Okkuperte hus..... ..... ☐
**62.7** Hotell ..... ..... ☐
**62.8** Ligget ute ..... ..... ☐
**62.9** På akuttmottak .... ..... ☐
**62.10** Institusjon ..... ..... ☐
**62.11** Annet……

**63. Hvor ofte pusser du tennene?**..... ..... ☐☐
0 = Aldri/Sjeldent 1 = 1g/uke, 2 = 2-3g/uka, 3 = 4-5 ganger i uke,
4 = 6-7 g/uke, 5 = Flere ganger om dagen

**64. Har du vanskeligheter med å tygge mat som kjøtt, frukt og grønnsaker?** ..... ☐☐
0 = Nei, 1 = Ja
**Hvis Ja, hva er problemet?**
*Marker svar(ene) de gir uoppfordret med **1 (ja)***
**64.1** Har mistet tenner. ..... ☐
**64.2** Sår i munnen..... ..... ☐
**64.3** Tørrhet i munnen ..... ☐
**64.4** Dårlig tilpasset gebiss ..... ☐
**64.5** Annet ..... .....

**65. Hvor ofte dusjer du (kroppsvask)?..... ..... ☐**
0 = Aldri/Sjeldent 1 = 1g/uke, 2 = 2-3g/uka, 3 = 4-5 ganger i uke,
4 = 6-7 g/uke, 5 = Flere ganger om dagen

**66. Hvor dusjet du sist (kroppsvask)?**
*Marker svar(ene) de gir uoppfordret med **1 (ja)***
**66.1** Der jeg bor ..... ..... ☐
**66.2** Hos kjæreste, samboer, ektefelle ..... ☐
**66.3** Hos søsken, foreldre, besteforeldre ..... ☐
**66.4** Hos øvrig familie ..... ☐
**66.5** Hos venner ..... ..... ☐
**66.6** På Natthjemmet .. ..... ☐
**66.7** På Urtegata/Fyrlystet ..... ☐
**66.8** På Pro senteret .... ..... ☐
**66.9** Andre steder…….

**67. Hva slags skolegang har du fullført?** ..... ..... ☐
0 = Ingen fullført skolegang, 1 = Grunnskole, 2 = Videregående,
3 = Høgskole, …4 = Universitet
**67.1** Hvor mange års skolegang har du til sammen? ..... ..... ☐☐

**68. Er du i lønnet arbeid?** . ..... ..... ☐
0 = Nei, 1 = Ja
**68.1 Hvis Ja, hva slags ansettelsesforhold har du?** ..... ..... ☐
1 = Fast arbeid, 2 =Korttidskontrakt, 3 = Selvstendig næringsdrivende,
4 = "Dagsen", 5 = Svart arbeid, 6 = Annet…….....

**69. Hvordan skaffer du deg penger?**
*Marker svar(ene) de gir uoppfordret med **1 (ja)***
**69.1** Sosial stønad ..... ..... ☐
**69.2** Uføretrygd..... ..... ☐
**69.3** Attføring ..... …….. ☐
**69.4** Inntekt fra lønnet arbeid..... ☐
**69.5** Ektefelle/samboer. ..... ☐
**69.6** Får penger av barn/foreldre/besteforeldre..... ☐
**69.7** Får penger fra øvrig familie..... ☐
**69.8** Brekk/innbrudd ... ..... ☐
**69.9** Prostitusjon ..... ..... ☐
**69.10** Annet……..

**70. Har du sovet/hvilt siste døgn:..... ..... ☐**
0 = Nei, 1 = Ja
**Hvis Ja:**
Når sto du opp i dag? .. .....Kl.☐☐.☐☐
Når la du deg? ..... .....Kl.☐☐.☐☐
**70.1 Sum timer ligget (A) ..... .....☐☐,☐timer**

**70.2 Hvor mange timer satt du og hvilte (B)**..... .....☐☐,☐**timer**
Sum timer ligget (A) + hvilt (B) ☐☐,☐timer

**72.3 Hvor mange timer har du vært på farten siste døgn (C) .....**☐☐,☐**timer**
**SUM** (A) + (B) + (C) = ☐☐ **(skal bli 24 timer)**

**71. Hvem liker du å være sammen med?**
*Marker svar(ene) de gir uoppfordret med **1 (ja)***
71.1Kjæreste, ektemake, samboer .....☐
71.2Foreldre, barn .... .....☐
71.3Øvrige familie.... .....☐
71.4Personer i det organiserte hjelpetilbudet .....☐
71.5Venner utenfor rusmiljøet.....☐
71.6Rusmisbrukere... .....☐
71.7Ikke noen ..... .....☐
71.8Andre .....

**Hvis *71.7 = Ikke Noen*, hopp over nr.72**

**72. Har du oppsøkt noen av disse den siste uken? ..... .....** ☐
0 = Nei, 1 = Ja

**73. Synes du at du får dekket ditt behov for å være sammen med andre?.....** ☐
0 = Nei, 1 = Ja

**74. Har du anledning til å være alene når du trenger det?. ..... .....** ☐
0 = Nei, 1 = Ja

**75. Har du noe å glede deg over i hverdagen? ..... .....** ☐
0 = Nei, 1 = Ja
**75 .1 Hvis Ja, hva da?…….**

**76. Har du håp for fremtiden? ..... .....** ☐
0 = Nei, 1 = Ja

Dato: 05 07 02 Intervjuer: 04 ID-nr.: 1138

98 = Vet ikke
99 = Ikke svart

| 80. Klokke-slett | 81. Måltids type | 82. Sted spist | 83. Sammen med | 84. Spist og drukket siste døgn | | 85. Antall | 86. Modell nr. | 87. Mengde i g eller dl | 88. Mat fra |
|---|---|---|---|---|---|---|---|---|---|
| 2 1230 | 2 | 4 | 4 | Eggerøre, pure, rå løk | V | | | 4 ss | 4 |
| | | | | Brødskive | V | 1,5 | | | |
| | | | | Bajonnsmurbr | V | 2 dl | | 5 | |
| | | | | Sleverpe ost | V | | | 7 sk. | |
| | | | | Tomat | V | | | 1 stk | |
| | | | | Bjørkål | V | | | 65 | |
| | | | | Eplemakas | V | | | 5 | |
| 1 9 | 1 | 1 | 1 | Brødskive | V | 1 | | 40 | 13 |
| | | | | Sleverpe ost | V | | | 25 | |
| | | | | Gulrot | V | | | 20 | |
| | | | | Kaffe | V | | | 5 | |

| 81. Måltidsttype | 82. Sted spist | | | 83. Sammen med | 88. Maten kom fra | |
|---|---|---|---|---|---|---|
| 1 = Brødmåltid | 1 = Der jeg bor | 6 = Natthjemmet | 10 = Pølsebu/ gatekjøkken/kiosk | 1 = Alene | Samme som spørsmål 82 | 17 = Fått av Skarpsno |
| 2= Middagsaktig måltid | 2 = Urtegata | 7 = På besøk hos familie/venner | 11 = Restaurant: | 2 = Venner | 13 = Kjøpt selv | |
| 3 = Mellommåltid | 3 = Suppebussen | 8 = Ute på gata | 12 = Annet | 3 = Familie | 14 = Fått av Frelsesarméen/Evangeliesenter et etc | |
| 4 = Annet | 4 = Pro senteret | | | 4 = Annet | 15 = Funnet i boss/ søppelkasse | |
| | 5 = Blåkors | 9 = På møtesteder, se guiden | | | 16 = Stjålet | |

## Ernæring og rusmisbruk

**Intervjuguide**

Det er viktig at en aller først bringer på det rene at informantene faktisk er rusmisbruker i betydningen narkomane. Rene alkoholikere og tidligere narkomane skal ikke intervjues i denne omgang. Aktive rusmisbrukere, rene morfinister/heroinister eller blandingsmisbrukere, inklusive tillegg av alkohol, skal med i denne undersøkelsen, og de skal ha ruset seg det siste døgnet. En må også understreke at spørsmålene er utformet for å nå gruppen i hele sin bredde, derfor vil en rekke spørsmål ikke passe for alle, eller oppleves som irrelevante og eventuelt ubehagelige.

De 15 første spørsmålene skal fylles ut av bioingeniørene. Resten fylles ut under intervju.

**1. Intervjuobjektets ID-nummer:**

Alle prøver og alle skjemaer skal merkes med Idnr. En del prøver skal i tillegg ha Løpenr:(NINA) hårprøver og blodprøve for tungmetallanalyse. For Fürst og SRI brukes klistrelapp fra nederst på rekvisisjonsskjema med prøvenummer og klistres på glassene/Eppendorfrørene.

**2. Dato seks siffer:**

**4.** Alder i hele år. Hvis de ikke husker eller er litt usikre, så spør hvilket årstall de er født.

**5**. Kjønn på engelsk for å passe FUTREX-syntaks.

**6.** Kandidaten veies med klær og sko på hvis de da ikke går i tøfler. For tøy trekkes følgende fra:

Langbukse/dongry: kvinner = 700 gram, menn = 800 gram
Skjorte/T-skjorte/tynn genser: kvinner = 200 gram , menn = 300 gram
Tykk genser/Collage genser: kvinner = 400 gram, menn = 500 gram.
Jakke: tynn boblejakke = 800 gram
Kjole: 400 – 600 gram
Joggesko: kvinner = 600 gram, menn = 875 gram.
Tynne sko = 450 gram

Annet oppgis i tekst og veies senere før fratrekk i regnestykket. Tynne støvletter veier ca. 550 gram, gummistøvler 1200 gram.

**8**. Netto kroppsvekt oppgis med en hektos nøyaktighet. Da FUTREX opererer med hele kilo, avrundes tallet til hele kilo etter vanlige forhøyningsregler: 0 til og med fire avrundes nedover til nærmeste hele tall. Fra og med 5 og til og med 9 forhøyes til nærmeste hele 10-tall.

**10.** Høyde måles mens kandidaten står med knær og føtter sammen, strake ben, løftet hode og Frankfurter-planet (linjen fra øverste ørefeste frem til ytre øyekrok) i vannrett stilling. Husk å måle såletykkelse og trekk fra.

**11.- Se prøveprotokoll Futrexinstruksjonen.**

**12. og 13.** forsikrer at prøvene faktisk er tatt.

## START INTERVJU!

**15.** Det er viktig å vite hvem som intervjuer, slik at en kan spore tilbake ved eventuelle uklarheter.

**16.** Å spørre om de røyker, er et ufarlig og greit spørsmål å starte med. Dessuten har det betydning for Cd-innholdet i hår.

**17.** og **18.** noteres ned som hele klokkeslett med timer og minutter, som så legges inn i databasen. Maskinen regner selv ut.

**19. Deltagelse**
Dette er ikke et spørsmål, bare en iakttagelse. Kanskje må den revurderes etter at intervjuet er ferdig. Vi vil forsøke å angi informantens grad av våkenhet, fordi det kan ha innvirkning på resultatene. 1 = søvnig på nippet til å sovne, 2-3-= nedsatt konsentrasjonsevne slik at spørsmålene må gjentas flere ganger for å bli forstått, 4 = litt nedsatt årvåkenhet, 5-7 normal våkenhetsgrad, 8-9 lett oppspilt, 10 = svært oppspilt, snakker ”pepper” (amfetaminrus).

**20. Bydel/Sosialkontor**
De som har fast bopel tilhører sosialkontoret i bydelen de bor. De som er UFB henter /får sosialpengene sine fra den sosialkontoret de tilhører. Dette vet de hvor er, så bare spør.

# KOSTINTERVJU

**21. og 22.** stilles spørsmålene, men svaralternativene nevnes ikke. Sett 1 på de svarene de gir.

**23.** Her skal spørsmålene pluss alle svaralternativene nevnes og alle skal besvares med tall fra 0 til 4. Se skjema. Vet ikke og Ikke svart er som sedvanlig henholdsvis 98 og 99.

**24. Skarpsno** (privat giver, ”gatebarnas far” som deler ut mat en til to ganger i måneden, også slikt som har gått ut på dato). Nå er han visstnok så gammel og skrøpelig, at rusmisbrukerne reiser hjem til han og henter bæreposer med mat.

**Frelsesarméen** (privat giver, delvis offentlig finansiert) deler ut brødmat ved Sentralbanestasjonen ved 12-14-tiden, og kjører suppebuss tirsdager og torsdager. I tillegg kan en få mat på stedet eller ta med seg fra Urtegata.

**Blå Kors** har/hadde kafé med servering fra klokken 07: pizza

**Evangeliesenteret:** (privat)”Matbuss” mandag, onsdag og torsdag, Dalsbergstien annenhver tirsdag

**Maritastiftelsen**: (privat)kafé og kontaktsenter, mandag til fredag klokken 19-23.

**Street Aid:** (privat) Kafébuss, mandag, onsdag og fredag klokken 20 til 23(24).

**Bollekompaniet**: (privat) utdeling av boller, kakao og matpakke tirsdager og torsdager ”trappa” klokken 22-23.15

**Oslo Vineyard:** utdeling av boller, kakao, matpakke, ”trappa” lørdager klokken 22-24. Gratis lunsj hver torsdag klokken 11 – 13.

**Håkon Berg**: deler ut mat og kakao på ”strøket” mandag kveld/natt ev. også onsdag.

**Pro senteret** (offentlig): lager middag to ganger i uken (tirsdager og torsdager), ellers vafler og lignende.

**29.** Her må en understreke at det gjelder alt som spises. Så vel vanlige matvarer og matretter som snop og sjokolade.

**30.** Spørsmålet skal kartlegge hva slags narkotiske stoffer de vanligvis bruker. Det vil si mer enn at de noen sinne har brukt det. Hvis de nøler, så antyd siste måned.

**31.** Norsk Rettstoksikologisk institutt skal teste både type stoff og mengde. Metoden registrerer siste dagers bruk, derfor spør vi bare etter siste døgns forbruk.

**32**. Administrasjonsmåten er ofte, men ikke alltid gitt. Derfor spør vi eksplisitt om det.

**33.** Ascorbinsyre fungerer som antioksydant gitt at stoffet kommer over i blodbanen i tilstrekkelige mengder og i aktiv form. Vi vil bruke ferdig oppveide prøver med pulver på 0,2, 0,5, og 1,1 gram for at de lettere skal kunne anslå hvor mye de bruker. Vi vet at mengden må være stor nok til å løse opp heroinet under oppvarming, men ikke så stor at det svir innsiden av årene; en bidragende årsak til at ”blodårene brukes opp”. For de som setter stoff i lysken er ikke dette noe problem, for sirkulasjonshastigheten i de store arteriene er så høy, at smerten forsvinner raskt. Det ser ut til at heroinister får luftveisinfeksjoner og lignende når de slutter med injeksjoner. Kan det ha sammenheng med nedgang i antioksydantkapasiteten?

**35.** Vi er her interessert i hygienen rundt det å sette sprøyter. Det er derfor av interesse å se om de vasker hendene. På feltstasjonene deles det ut Desi skum (desinfiserende skum) dette regnes som ensbetydende med å vaske hendene.

**36.** Alko-tip er en liten engangs ”serviett” med desinfeksjonsmiddel, som brukes til å tørke hudområde hvor man skal sette sprøyten. Feltstasjonene deler ut slike. Det er derfor av interesse å se om de bruker disse.

**37.** Rusmisbrukerne sleiker ofte på sprøytespissen, slik at den glir lettere inn i huden. Spytt er fullt av bakterier, det er derfor interessant i forhold til hygiene å spørre om dette.

**46. Opphold på institusjon:**

-Rusmisbrukeren får en ernæringsmessig økning når de er innlagt på institusjon, blir et avvik fra det normale som kan innvirke på det totale bildet.

- gjelder ikke akuttplasser

- ang. psykiatrisk inst. ønsker å se hvor mange som har vært innlagt ifht. at 2/3 av rusmisbrukerne har psykiske lidelser og ifht. spørsmålet om angst og depresjon.

**50, 51.** Her har vi forsøkt å liste opp de vanligste sykdommer som rammer rusmisbrukere. Hjerte-karsyksdommer skyldes sykelige forandringer i hjerte og kroppens øvrige karsystem. Dette omfatter hjerterytmeforstryrrelser, (for høy eller for lav puls), hjertesvikt, høyt blodtrykk, for lavt blodtrykk, sjokk: for eksempel anafylaktisk sjokk, infeksiøst sjokk, nevrogent sjokk. Arteriosklerose, angina pectoris, hjerteinfarkt, klaudikatsio intermittens/restless legs, hjerneblødning, blodpropp, reumatisk feber etter streptokokkinfeksjon hvor hjertet angripes, bakteriell endokarditt, perikarditt, hjertefeil, hjertemuskelsykdom etc. AD/HD er en betegnelse for permanent hyperaktivitet og konsentrasjonsvansker sannsynligvis som følge av organskader i hjernen.

**52.** Det er stor forskjell på å bruke medikamenter som rus, eller for å holde seg frisk. Her er vi ute etter det siste. Nødvendig medisinering for å opprettholde helsen.

**53.** Fra et ernæringssynspunkt er det interessant å vite om kvinnene har menstruasjon, ev. store blødninger av hensyn til jernstatus.

**54.** Bruk av prevensjon vil si noe om evne til egenomsorg både hos kvinner og menn, men også ev forklare amenorré (uteblitt menstruasjon) ved bruk av P-sprøyte.

**55.** Vi har her valgt å forhøre oss om Feltpleien spesifikt, siden vi vet at rusmisbrukerne sjelden bruker sin fastlege. Vi ønsker derfor å se om rusmisbrukerne oppsøker Feltpleien når de er syke; - antyd tidsrommet de tre siste månedene.

**56.** Det er på dette spørsmålet viktig å kartlegge om vedkommende selv tar initiativ til å oppsøke lege. Om de oppsøker lege/legevakt ved sykdom vil gi et bilde av om de faktisk våger det, og samtidig være et uttrykk for evne til egenomsorg.

**58, 59, 60.** Omsorg under oppvekst. I denne perioden utvikles selvet, identiteten formes. Kontinuitet, stabilitet og sammenheng i tilværelsen blir nøkkelord.

**61.** Göran Sundín mener at svært mange rusmisbrukere burde vært fanget opp/ikke fikk tilstrekkelig hjelp, selv om behovet ble avdekket. Derfor tar vi med dette.

**68. og 69.** Forteller også en historie om et mer eller mindre verdig liv. Svarer rusmisbrukeren ja, og det er prostitusjon, krysser vi for nei, og spør om det er andre jobber de har. Samtidig krysser vi for prostitusjon i spørsmål 69.

**70.** Her er vi ute etter å kartlegge aktivitet og hvile hos rusmisbrukerne. Det spørres derfor om hvor mange timer de har sovet det siste døgnet. Dette plusses sammen med hvor mange timer

de har hvilt det siste døgnet. Med hviling menes her f.eks. at man sitter og dupper av etter et skudd. Det spørres også om hvor mange timer de har vært på farten det siste døgnet. Det er på dette spørsmålet viktig at man passer på at antall timer de har vært på farten, sovet og hvilt blir 24 timer totalt.

**80-88**. Her fremgår svaralternativene fra spalter nederst på arket. Måltidstype er vår bedømmelse, her skal det altså ikke spørres. Alternativene er brødmåltider som omfatter små og store brødmåltider med tilbehør som kaldt og varmt drikke.